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March 25, 2004
Date

David L. Parker

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:
Leon, et al.

Serial No.: 09/550,752

Filed: March 24, 2004

For: SYSTEM AND METHOD OF
INVESTMENT MANAGEMENT
INCLUDING MEANS TO ADJUST
DEPOSIT AND LOAN DOCUMENTS
FOR INFLATION

Group Art Unit: 3624

Examiner: Hamilton, Lalita M.

Atty. Dkt. No.: TTHC:003US

BRIEF ON APPEAL

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APPENDIX 1: Pending Claims on Appeal

APPENDIX 2: Exhibits

Exhibit A – Youden *et al.*

Exhibit B – Aztec Properties

Exhibit C – Robbins

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FOR INFLATION

Group Art Unit: 3624

Examiner: Hamilton, Lalita M.

Atty. Dkt. No.: TTHC:003US

APPEAL BRIEF

MS AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Appellants hereby submit an original and two copies of this Appeal Brief to the Board of Patent Appeals and Interferences in response to the final Office Action dated December 17, 2003 (the "Action"). The Notice of Appeal was filed on February 6, 2004 and received in the PTO on February 11, 2004, making the present appeal brief due on April 11, 2004. In that April 11 is a Sunday, the present brief is due no later than April 12, 2004.

The fee for filing this Appeal Brief is \$165.00 and is enclosed herewith. Please date stamp and return the attached postcard as evidence of receipt.

I. REAL PARTY IN INTEREST

The real party in interest is Trans Texas Holdings Corp.

II. RELATED APPEALS AND INTERFERENCES

There are currently pending two related reexaminations, Reexam Serial Numbers 90/005,841 and 90/005,842, in which appeals are pending.

III. STATUS OF THE CLAIMS

Claims 1-33 were originally filed in the present application on August 27, 1985. In a preliminary amendment filed April 17, 2000, the present application was declared to be a continuation of USSN 09/184,752 in order to proceed with the prosecution of claims 55-67 and 65-67 from that application. Thus, in the preliminary amendment, original claims 1-33 in the present application were cancelled and claims 34-45 were added. Claims 55-67 and 65-67 from USSN 09/184,752 form the basis for claims 34-45 of the present application.

Claims 34-45 are currently pending, are the subject of the present appeal, and stand appealed. A copy of the appealed claims is attached as Appendix 1 to this brief.

IV. STATUS OF AMENDMENTS

No amendments were sought to the pending claims.

V. SUMMARY OF THE INVENTION

The invention defined by the pending claims concerns generally an investment system that institutes inflation-adjusted deposit and loan accounts and matches such accounts to provide an improved capital structure for a financial institution. The system projects the impact of

inflation-indexed deposit and loan accounts on the institution's capital structure for preselected or anticipated inflationary environments. Based on such projections and other general considerations, one of several forms of deposit accounts is selected according to the requisites of the depositor or borrower and those of the institution. The systems are represented generally by independent claims 34, 38, and 42.

As contemplated under the present invention, the accounts are characterized by a principal component and an accrual component. The principal component is that proportion of the overall account balance attributable to the initial cash investment. The accrual component indicates that proportion of the overall account balance attributable to inflation and fixed interest. The account components are periodically enhanced or reduced in a manner specified by the characteristics of the particular account selected.

The accrual component will generally include both a fixed interest component and a variable interest component with the variable interest component being responsive to the rate of inflation. Responsive to the rate of inflation, as used herein, means "directly responsive" to a market indicator of prior actual inflation and it is not meant to include the market's expectation of future inflation. Under one alternative, the principal component is enhanced by the variable interest component and the account retired by retiring the fixed interest component by one schedule and retiring the principal component by a second schedule. However, the account may be retired by retiring both components over a similar schedule or by amortization. By varying the manner in which each respective component is accrued or retired, the cash flow characteristics of the account can be significantly altered to fit the requisites of the individual or institution. Cash flow is defined as the overall flow of cash units from the account, or a selected

account component, to the account holder who will either be the lender or depositor, at a specified time.

Since the accrual component of either loan or deposit accounts may be adjusted in response to inflation, they can potentially exhibit unfavorable cash flows. Therefore, it is generally desirable to match loan accounts with deposit accounts, and further generally desirable to match accounts with similar intrinsic cash flow characteristics as specified by their accrual and retirement features. In this manner, cash flow patterns of the loan account would mirror those of the matched deposit account. Thus, during times of inflation, for example, negative cash flows attributable to outgoing retirement payments on deposit accounts will be compensated for by incoming payments on loan accounts.

Once the appropriate form of deposit and loan accounts are selected, matched and placed with the institution, data processing is utilized to service them during their respective terms. As referred to herein, the account term is the time period over which the account is retired or "paid out" to the account holder. The account term is generally divided into a plurality of adjustment or iteration periods, however, terms may be scheduled to include only a single iteration. Servicing includes the determination of inflation adjustments to the account balance or, alternatively, the inflation premium due the account holder. Servicing also includes features which protect the principal or balance of the accounts from the effects of deflation and reports all bookable income to holder.

Servicing further includes data processing for retiring and enhancing the accounts according to their respective terms and schedules. Retirement is meant to include a reduction in the particular account component and enhancement is meant to include an increase or accrual of the particular account component. For example, accrual components may be retired separately

from the principal component by selecting separate schedules for each. Thus, for example, the principal may be retired semi-annually and the accrual retired annually. Schedules may be selected which adjust particular components by a predetermined amount. Alternatively, account components may be retired by amortization.

VI. ISSUES ON APPEAL

- 1) Is the subject matter of claims 34 and 36-37 obvious over Youden *et al.* ("Youden" – Exhibit A) in view of Aztec Properties (Exhibit B)?
- 2) Is the subject matter of claim 35 obvious over the combination of Youden and Aztec Properties in further view of U.S. Department of Labor ("U.S. Dept. of Labor" – copy not available)?
- 3) Is the subject matter of claims 38, 40-42, and 44-45 obvious over the combination of Youden and Aztec Properties in further view of Robbins (Exhibit C)?
- 4) Is the subject matter of claims 39 and 43 obvious over the combination of Youden, Aztec Properties, and Robbins in further view of U.S. Dept. of Labor?

VII. GROUPING OF THE CLAIMS

For purposes of this Appeal, independent claims 34, 38, and 42 are each asserted to be independently patentable, for similar reasons. Dependent claims 35, 39, and 43 stand or fall with their respective independent claims. Dependent claims 36 and 37 stand or fall together and are asserted to be separately patentable from independent claim 34. Dependent claims 40 and 41 stand or fall together and are asserted to be separately patentable from independent claim 38. Dependent claims 44 and 45 stand or fall together and are asserted to be separately patentable from independent claim 42.

VIII. ARGUMENT

A. Rejection of Claims 34 and 36-37 under 35 U.S.C. § 103(a)

1. Summary of the Rejection

The Final Action maintains a rejection of claims 34 and 36-37 under 35 U.S.C. § 103(a) as obvious over the Youden patent in view of Aztec Properties. The Action takes the position that Youden teaches each of the elements of the claims except for what the inflation is based on, and that Aztec Properties provides this teaching. Appellants respectfully appeal this rejection.

2. Appellants' Remarks

a) *Substantial evidence required to uphold the Examiner's position*

As an initial matter, Appellant notes that findings of fact and conclusions of law by the U.S. Patent and Trademark Office must be made in accordance with the Administrative Procedure Act, 5 U.S.C. § 706(A), (E), 1994. *Dickinson v. Zurko*, 527 U.S. 150, 158 (1999). Moreover, the Federal Circuit has held that findings of fact by the Board of Patent Appeals and Interferences must be supported by "substantial evidence" within the record. *In re Gartside*, 203 F.3d 1305, 1315 (Fed. Cir. 2000). In *Gartside*, the Federal Circuit stated that "the 'substantial evidence' standard asks whether a reasonable fact finder could have arrived at the agency's decision." *Id.* at 1312.

Accordingly, an Examiner's position on Appeal must be supported by "substantial evidence" within the record in order to be upheld by the Board of Patent Appeals and Interferences.

b) *The standard for obviousness*

In order to establish a *prima facie* case of obviousness, three basic criteria must be met: (1) there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to

combine reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art reference (or references when combined) must teach or suggest all the claim limitations. *Manual of Patent Examining Procedure* (M.P.E.P.) § 2142. Moreover, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on the Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). When "the motivation to combine the teachings of the references is not immediately apparent, it is the duty of the examiner to explain why the combination of the teachings is proper." M.P.E.P. § 2142.

c) *The argument in summary*

Here, the Action has not established a *prima facie* case of obviousness, for it has not established at least one of the necessary criteria. The cited references, even when combined, do not teach or suggest all the claim limitations of claims 34 and 36-37.

d) *The cited references do not render claim 34 unpatentable*

- (1) All the limitations of claim 34 are not taught or suggested by the references

Independent claim 34 recites, in part, "An inflation adjusted financial instrument comprising . . . a principal component, the principal component *being periodically adjusted for inflation . . .*; wherein *periodic interest payments are paid based on the inflation-adjusted principal component* at the time said periodic interest payments are paid; and wherein the *inflation adjusted principal component is payable* at the end of the term." Such features are nowhere taught or suggested in the cited art, taken alone or in combination.

- (a) The cited art does not teach or suggest a principal component being periodically adjusted for inflation

The initial Office Action asserts that the elements of claim 34 involving a principal component that is periodically adjusted for inflation are disclosed in Youden at col. 2, lines 15-

25 and 35-40 and col. 5, lines 30-48. However, these excerpts from Youden merely relate to a method of calculating the effect of a selected *arbitrary inflation number* upon an account value such as a mortgage account or deposit account. Thus, it cannot be said that these excerpts teach a principal component being *periodically adjusted* to obtain an inflation-adjusted principal component.

The Youden patent merely concerns a device that can be used to calculate a minimum principal payout into an account in order to achieve a desired payout of contracted dollars at a future time. Youden makes an *arbitrary allowance for inflation* to arrive at the size of the initial deposit that will provide future fixed payments and is in no way related to the actual inflation that takes place in the future. In contrast, in providing for *periodic adjustment* of the principal component to account for the *actual inflation* that takes place in the future, the present invention is concerned with an arbitrary deposit at the discretion of the depositor which earns interest that is systematically related to the actual inflation that takes place in the future in order to provide exact inflation protection on the purchasing power of the deposit.

The above arguments were made in the response to the initial Office Action, but the Final Action continues to misconstrue the basic teachings of the both the Youden patent and the present invention. The Final Action asserts that "Youden discloses a financial instrument comprising a means for adjusting accounts for both inflation and deflation (col. 5, lines 29-50). It is inherent that the user may use the financial instrument to adjust for either past or future inflation in order to protect their accounts against potential loss in value due to inflation." It is a complete misrepresentation of the teachings of the Youden patent to state that Youden "discloses a financial instrument comprising a means for *adjusting* accounts for both inflation or deflation." Instead of providing a means to *adjust* an account for inflation, what the Youden

patent actually discloses is a means for making an *arbitrary allowance for inflation* to arrive at the size of an initial deposit. Youden in no way teaches the *adjustment* of the account for inflation, as the term "adjustment" necessarily implies a modification to the account *after* the initial deposit is made. The mere fact that Youden makes an arbitrary allowance for inflation to arrive at the size of an initial deposit simply does not establish the claimed elements, nor does it advance any basis for obviousness under an "inherency" theory. *In re Newell*, 13 U.S.P.Q.2d 1248 (Fed. Cir. 1989) ("*[A] retrospective view of inherency is not a substitute for some teaching or suggestion which supports the selection and use of the various elements in the particular claimed combination.*") (emphasis added).

In addition to misrepresenting the teachings of the Youden patent, the Action also fails to acknowledge the basic teachings of Appellants' invention. The Final Action broadly asserts that "nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation." Appellants submit that this assertion is simply false, given that a method of adjusting an account for past inflation is clearly present in numerous instances in the claim. As noted previously, claim 34 includes the language "the principal component being *periodically adjusted for inflation* . . . to obtain an *inflation-adjusted* principal component."

To summarize on this issue, the Youden patent does not teach, either explicitly or inherently, the *adjustment* of a principal component for inflation. Furthermore, the other cited reference, Aztec Properties, also fails to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties teaches this element). As this element is a critical element of Appellants' independent claim 34, no *prima facie* case of obviousness

has been made. Accordingly, Appellants request that the rejection of claim 34 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

- (b) The cited art does not teach or suggest setting up an account that is paid out according to past, known inflation

The initial Office Action asserts that the elements of independent claim 34 involving setting up an account that is paid out according to past, known inflation are disclosed in Youden at col. 5, lines 35-45 and col. 3, lines 32-38. However, these excerpts from Youden merely discuss selecting a *hypothetical rate of inflation* and applying that *hypothetical rate of inflation* to a payment stream to test the effects of inflation on the monthly payments (col. 5, lines 35-45) and recording the outstanding indebtedness of various borrowers based on money paid on a debt or money loaned on an account (col. 3, lines 32-38). Thus, it cannot be said that these excerpts even remotely teach an account that is actually paid out according to *past, known inflation*.

The above argument was made in the response to the initial Office Action, but the only response to this argument in the Final Action is the assertion that “nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation.” First, this response completely fails to address Appellants’ argument that the excerpts from Youden cited in the initial Office Action contain no teaching concerning setting up an account that is paid out according to past, known inflation. Appellants contend that this failure in the Action is wholly reflective of the fact that there simply are no such teachings in Youden. Second, as noted above, the Action’s assertion that “nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation” is completely false, given that a method of setting up an account that is paid out according to past, known inflation is clearly present in numerous instances in the claim. Claim 34 includes the language “wherein *periodic interest payments are paid* based on the *inflation-adjusted*

principal component at the time said periodic interest payments are paid; and wherein the *inflation-adjusted principal component is payable* at the end of the term.”

To summarize on this issue, the Youden patent does not teach, either explicitly or inherently, setting up an account that is paid out according to past, known inflation. Furthermore, the other cited reference, Aztec Properties, also fails to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties teaches this element). As this element is a critical element of Appellants’ independent claim 34, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claim 34 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

e) The cited references do not render claims 36-37 unpatentable

Claims 36-37 depend from claim 34. Therefore, claims 36-37 include all of the limitations of claim 34. Accordingly, Appellants submit that claims 36-37 are patentable over the cited references for at least the same reasons discussed in detail in the previous section of this Appeal Brief. Appellants hereby incorporate the above arguments for claim 34 into this section of the Appeal Brief. Furthermore, Appellants submit that claims 36-37 are patentable over the cited references for the additional reasons discussed below.

(1) All the limitations of claims 36-37 are not taught or suggested by the references

Dependent claim 36 recites, “The financial instrument of claim 34, wherein said financial instrument comprises a debt instrument.” Dependent claim 37 recites, “The financial instrument of claim 36, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.” Such features are nowhere taught or suggested in the cited art, taken alone or in combination.

- (a) The cited art does not teach or suggest a financial instrument comprising a debt instrument

The initial Office Action asserts that the elements of claims 36-37 involving a financial instrument comprising a debt instrument are disclosed in Youden at col. 1, lines 25-30 and 45-50. However, these excerpts from Youden merely relate to a calculator apparatus for calculating minimum principal amounts for deposit into selected term accounts. Thus, it cannot be said that these excerpts teach a financial instrument comprising a debt instrument.

As noted previously, the Youden patent merely concerns a *device* (more specifically, a calculator) that can be used to calculate a minimum principal payout into an account in order to achieve a desired payout of contracted dollars at a future time. In contrast, claims 36-37 teach a financial instrument that actually *incorporates* a debt instrument such as a bond or annuity account in providing for periodic adjustment of the principal component to account for the actual inflation that takes place in the future. Thus, while Youden is only concerned with a term account as one possible application upon which the actual invention, the calculator, can operate to achieve a desired payout of contracted dollars at a future time, the debt instrument in claims 36-37 is actually *integrated* into the claimed financial instrument as the vehicle for earning interest that is systematically related to the actual inflation that takes place in the future in order to provide exact inflation protection on the purchasing power of the initial deposit.

To summarize on this issue, the Youden patent does not teach, either explicitly or inherently, a financial instrument comprising a debt instrument. Furthermore, the other cited reference, Aztec Properties, also fails to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties teaches this element). As this element is a critical element of Appellants' dependent claims 36-37, no *prima facie* case of obviousness

has been made. Accordingly, Appellants request that the rejection of claims 36-37 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

B. Rejection of Claim 35 under 35 U.S.C. § 103(a)

1. Summary of the Rejection

The Final Action maintains a rejection of claim 35 under 35 U.S.C. § 103(a) as obvious over the Youden patent in view of Aztec Properties and further in view of U.S. Dept. of Labor. The Action takes the position that Youden and Aztec Properties when combined teach each of the elements of the claim except for the Consumer Price Index (CPI) comprising the Consumer Price Index for all urban consumers (CPI-U), and that U.S. Dept. of Labor provides this teaching. Appellants respectfully appeal this rejection.

2. Appellants' Remarks

a) The cited references do not render claim 35 unpatentable

Claim 35 depends from claim 34. Therefore, claim 35 includes all of the limitations of claim 34. Accordingly, Appellants submit that claim 35 is patentable over the cited references for the same reasons discussed in detail in the previous section of this Appeal Brief. Appellants hereby incorporate the above arguments for claim 34 into this section of the Appeal Brief. Accordingly, Appellants request that the rejection of claim 35 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

C. Rejection of Claims 38, 40-42, and 44-45 under 35 U.S.C. § 103(a)

1. Summary of the Rejection

The Final Action maintains a rejection of claims 38, 40-42, and 44-45 under 35 U.S.C. § 103(a) as obvious over the Youden patent in view of Aztec Properties and Robbins. The Action takes the position that Youden teaches each of the elements of the claims except for (1) what the inflation is based on, and (2) variable interest components payable periodically, the variable

interest components beings adjusted for inflation. The Action states that Aztec Properties provides the teaching for inflation based on the Consumer Price Index (CPI) and that Robbins provides the teaching for variable interest rates components. Appellants respectfully appeal this rejection.

2. Appellants' Remarks

a) *The argument in summary*

Regarding both the "substantial evidence" requirement for the Examiner's position on appeal and the criteria that must be met in order to establish a *prima facie* case of obviousness, Appellants hereby incorporate the previous arguments for those two topics for claim 34 into this section of the Appeal Brief.

Here, the Action has not established a *prima facie* case of obviousness, for it has not established at least two of the necessary criteria. There is no suggestion or motivation to combine the teachings of the Youden and Robbins references. In addition, the cited references, even when combined, do not teach or suggest all the claim limitations of claims 38, 40-42, and 44-45.

b) *The cited references do not render claim 38 unpatentable*

- (1) There is no motivation or suggestion to combine the teachings of Youden and Robbins

Claim 38 contains the limitation "an accrual component having fixed and *variable interest components . . .*, said *variable interest component* being adjusted for inflation" The initial Office Action concedes that "Youden does not disclose variable interest components payable periodically, said variable interest components being adjusted for inflation." The Action goes on to state:

The use of variable interest components in financial instruments is well known in the art. Robbins teaches a method and system for determining and computing interest rates wherein the

interest rate fluctuates (varies) (see abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a variable interest rate, as taught by Robbins, into the device disclosed by Youden, to provide an interest rate, in addition to the fixed rate, that is adjustable based on inflation.

As explained previously, Youden makes an arbitrary allowance for inflation to arrive at the size of the initial deposit that will provide future fixed payments and is in no way related to the actual inflation that takes place in the future. Thus, the concept of variable interest rates is totally irrelevant to the teachings of Youden, because once the initial calculation is done to arrive at the size of the initial deposit, no further opportunity is afforded to account for variations in the initial interest rate. Consequently, there is no suggestion or motivation, either in the references themselves or in the knowledge generally available to one of skill in the art, to modify the teachings of Youden to incorporate variable interest rates, as doing so would require modifications to the very core of Youden's teachings such that the principle of operation of Youden would be modified. "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." M.P.E.P. § 2143.01 (citing *In re Ratti*, 270 F.2d 810 (CCPA 1959)).

At best, the Action's only support for combining Youden with Robbins is that it could be within the capabilities of one of ordinary skill in the art to make such a combination of the two references. However, the courts have held that type of support in an obviousness rejection is insufficient, as a matter of law: "The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination." M.P.E.P. § 2143.01 (citing *In re Mills*, 916 F.2d 680 (Fed. Cir. 1990)). The Action's combination of these references, absent any evidence of a suggestion or motivation to actually combine them, amounts to an impermissible, hindsight analysis. See

Loctite Corp. v. Ultraseal Ltd., 781 F.2d 861, 873 (Fed. Cir. 1985) (noting that it is improper for an Examiner to employ impermissible hindsight in reconstructing the elements necessary to achieve the invention piecemeal from the prior art).

Because there is no suggestion or motivation to combine the Youden and Robbins references, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claim 38 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

- (2) All the limitations of claim 38 are not taught or suggested by the references

Independent claim 38 recites, in part, “An inflation adjusted financial instrument comprising . . . an accrual component having fixed and variable interest components *payable periodically*, said variable interest component *being adjusted for inflation . . .*” Such features are nowhere taught or suggested in the cited art, taken alone or in combination.

- (a) The cited art does not teach an accrual component being adjusted for inflation

The initial Office Action asserts that the elements of claim 38 involving an accrual component that is adjusted for inflation are disclosed in Youden at col. 5, lines 5-27 and fig. 3a-g. However, these excerpts from Youden merely relate to a method of depositing a selected amount into a term account for the purpose of creating a residual and determining the amount that must be deposited to the residual to accrue to or produce a desired residual amount at the end of the pay period. Thus, it cannot be said that these excerpts teach an accrual component being *adjusted* for inflation.

Youden makes an *arbitrary allowance for inflation* to arrive at the size of the initial deposit that will provide future fixed payments and is in no way related to the actual inflation that takes place in the future. In contrast, in providing for *adjustment* of the accrual component

to account for the *actual inflation* that takes place in the future, the present invention is concerned with an arbitrary deposit at the discretion of the depositor which earns interest that is systematically related to the actual inflation that takes place in the future in order to provide exact inflation protection on the purchasing power of the deposit.

The above arguments were made in the response to the initial Office Action, but the Final Action continues to misconstrue the basic teachings of the both the Youden patent and the present invention. The Final Action asserts that "Youden discloses a financial instrument comprising a means for adjusting accounts for both inflation and deflation (col. 5, lines 29-50). It is inherent that the user may use the financial instrument to adjust for either past or future inflation in order to protect their accounts against potential loss in value due to inflation." It is a complete misrepresentation of the teachings of the Youden patent to state that Youden "discloses a financial instrument comprising a means for adjusting accounts for both inflation or deflation." Instead of providing a means to *adjust* an account for inflation, what the Youden patent actually discloses is a means for making an *arbitrary allowance for inflation* to arrive at the size of an initial deposit. Youden in no way teaches the *adjustment* of the account for inflation, as the term "adjustment" necessarily implies a modification to the account *after* the initial deposit is made. The mere fact that Youden makes an arbitrary allowance for inflation to arrive at the size of an initial deposit simply does not establish the claimed elements, nor does it advance any basis for obviousness under an "inherency" theory. *In re Newell*, 13 U.S.P.Q.2d 1248 (Fed. Cir. 1989) ("*[A] retrospective view of inherency is not a substitute for some teaching or suggestion which supports the selection and use of the various elements in the particular claimed combination.*") (emphasis added).

In addition to asserting that the Youden patent alone broadly discloses an accrual component being adjusted for inflation, the initial Office Action also appears to argue that because Robbins discloses the *concept* of a variable interest rate, the combination of Youden and Robbins specifically provides a variable interest component being adjusted for inflation. However, Appellants assert that the mere teaching of “an interest rate . . . that is adjustable based on inflation” (see initial Office Action, p. 4), as the Action describes the combined teachings of Youden and Robbins, is simply not equivalent to the element of claim 38 that is at issue here, which is a “variable interest component being adjusted for inflation.” The Action states that Robbins “teaches a method and system for determining and computing interest rates wherein the interest rate fluctuates (varies).” As Appellants explained above, Youden makes an *arbitrary allowance for inflation* to arrive at the size of the initial deposit that will provide future fixed payments and is in no way related to the actual inflation that takes place in the future. Youden in no way teaches the *adjustment* of the account for inflation, as the term “adjustment” necessarily implies a modification to the account *after* the initial deposit is made. Merely combining the *concept* of variable interest rates, which is all the Action alleges that Robbins teaches, with the teachings of Youden does not change the fundamental teachings of Youden. Thus, the combined teachings of Robbins and Youden still fail to teach the *adjustment* of the account for actual inflation, as claim 38 teaches.

Apart from the Action’s misrepresenting the teachings of the Youden patent, the Action also fails to acknowledge the basic teachings of Appellants’ invention. The Final Action broadly asserts that “nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation.” Appellants submit that this assertion is simply false, given that a method of adjusting an account for past inflation is clearly present in

the claim. As noted previously, claim 38 includes the language “said variable interest component being *adjusted for inflation*.”

To summarize on this issue, the Youden patent, either alone or in combination with Robbins, does not teach, either explicitly or inherently, the *adjustment* of an accrual component for inflation. Furthermore, the other cited reference, Aztec Properties, also fails to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties teaches this element). As this element is a critical element of Appellants’ independent claim 38, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claim 38 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

- (b) The cited art does not teach or suggest setting up an account that is paid out according to past, known inflation

The initial Office Action asserts that the elements of independent claim 38 involving setting up an account that is paid out according to past, known inflation are disclosed in Youden at col. 3, lines 32-38. However, this excerpt from Youden merely discusses recording the outstanding indebtedness of various borrowers based on money paid on a debt or money loaned on an account (col. 3, lines 32-38). Thus, it cannot be said that this excerpt even remotely teaches an account that is actually paid out according to *past, known inflation*.

The above argument was made in the response to the initial Office Action, but the only response to this argument in the Final Action is the assertion that “nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation.” First, this response completely fails to address Appellants’ argument that the excerpts from Youden cited in the initial Office Action contain no teaching concerning setting up an account that is paid out according to past, known inflation. Appellants contend that this

failure in the Action is wholly reflective of the fact that there simply are no such teachings in Youden. Second, as noted above, the Action's assertion that "nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation" is completely false, given that a method of setting up an account that is paid out according to past, known inflation is clearly present in numerous instances in the claim. Claim 38 includes the language "an accrual component having fixed and variable interest components *payable periodically*, said variable interest component being *adjusted for inflation*."

To summarize on this issue, the Youden patent does not teach, either explicitly or inherently, setting up an account that is paid out according to past, known inflation. Furthermore, the other cited references, Aztec Properties and Robbins, also fail to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties or Robbins teaches this element). As this element is a critical element of Appellants' independent claim 38, no *prima facie* case of obviousness has been made. Accordingly, Appellants requests that the rejection of claim 38 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

c) The cited references do not render claims 40-41 unpatentable

Claims 40-41 depend from claim 38. Therefore, claims 40-41 include all of the limitations of claim 38. Accordingly, Appellants submit that claims 40-41 are patentable over the cited references for at least the same reasons discussed in detail in the previous section of this Appeal Brief. Appellants hereby incorporate the above arguments for claim 38 into this section of the Appeal Brief. Furthermore, Appellants submit that claims 40-41 are patentable over the cited references for the additional reasons discussed below.

- (1) All the limitations of claims 40-41 are not taught or suggested by the references

Dependent claim 40 recites, "The financial instrument of claim 38, wherein said financial instrument comprises a debt instrument." Dependent claim 41 recites, "The financial instrument of claim 38, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account." Such features are nowhere taught or suggested in the cited art, taken alone or in combination.

- (a) The cited art does not teach or suggest a financial instrument comprising a debt instrument

The initial Office Action asserts that the elements of claims 40-41 involving a financial instrument comprising a debt instrument are disclosed in Youden at col. 1, lines 25-30 and 45-50. However, these excerpts from Youden merely relate to a calculator apparatus for calculating minimum principal amounts for deposit into selected term accounts. Thus, it cannot be said that these excerpts teach a financial instrument comprising a debt instrument.

As noted previously, the Youden patent merely concerns a *device* (more specifically, a calculator) that can be used to calculate a minimum principal payout into an account in order to achieve a desired payout of contracted dollars at a future time. In contrast, claims 40-41 teach a financial instrument that actually *incorporates* a debt instrument such as a bond or annuity account in providing for periodic adjustment of the principal component to account for the actual inflation that takes place in the future. Thus, while Youden is only concerned with a term account as one possible application upon which the actual invention, the calculator, can operate to achieve a desired payout of contracted dollars at a future time, the debt instrument in claims 40-41 is actually *integrated* into the claimed financial instrument as the vehicle for earning interest that is systematically related to the actual inflation that takes place in the future in order to provide exact inflation protection on the purchasing power of the initial deposit.

To summarize on this issue, the Youden patent does not teach, either explicitly or inherently, a financial instrument comprising a debt instrument. Furthermore, the other cited references, Aztec Properties and Robbins, also fail to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties or Robbins teach this element). As this element is a critical element of Appellants' dependent claims 40-41, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claims 40-41 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

d) *The cited references do not render claim 42 unpatentable*

- (1) There is no motivation or suggestion to combine the teachings of Youden and Robbins

The previous argument for claim 38 regarding the lack of a motivation or suggestion to combine the Youden and Robbins references is hereby incorporated into this section of the Appeal Brief. Because there is no motivation or suggestion to combine the Youden and Robbins references, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claim 42 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

- (2) All the limitations of claim 42 are not taught or suggested by the references

Independent claim 42 recites, in part, "An inflation adjusted financial instrument comprising . . . an accrual component having fixed and variable interest components *payable at the end of the term* of the financial instrument, said variable interest component *being periodically adjusted for inflation . . .*." Such features are nowhere taught or suggested in the cited art, taken alone or in combination.

- (a) The cited art does not teach an accrual component being adjusted for inflation

The initial Office Action asserts that the elements of claim 42 involving an accrual component that is adjusted for inflation are disclosed in Youden at col. 5, lines 5-27 and fig. 3a-g. The initial Office Action also appears to argue that the combination of Youden and Robbins specifically provides a variable interest component being adjusted for inflation. The previous arguments for claim 38 regarding these excerpts from Youden and the combination of Youden and Robbins are hereby incorporated by reference into this section of the Appeal Brief.

With regard to the Final Action's broad assertion that "nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation," Appellants submit that this assertion is simply false, given that a method of adjusting an account for past inflation is clearly present in the claim. Claim 42 includes the language "said variable interest component being *adjusted for inflation*."

To summarize on this issue, the Youden patent, either alone or in combination with Robbins, does not teach, either explicitly or inherently, the *adjustment* of an accrual component for inflation. Furthermore, the other cited reference, Aztec Properties, also fails to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties teaches this element). As this element is a critical element of Appellants' independent claim 42, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claim 42 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

- (b) The cited art does not teach or suggest setting up an account that is paid out according to past, known inflation

The initial Office Action asserts that the elements of independent claim 42 involving setting up an account that is paid out according to past, known inflation are disclosed in Youden at col. 3, lines 32-38. The previous arguments for claim 38 regarding this excerpt from Youden are hereby incorporated by reference into this section of the Appeal Brief.

With regard to the Action's assertion that "nowhere in the claims is there a method of providing an account that is adjusted and ultimately paid out based on inflation," Appellants again argue that is completely false, given that a method of setting up an account that is paid out according to past, known inflation is clearly present in the claim. Claim 42 includes the language "an accrual component having fixed and variable interest components *payable at the end of the term*, said variable interest component being *adjusted for inflation*."

To summarize on this issue, the Youden patent does not teach, either explicitly or inherently, setting up an account that is paid out according to past, known inflation. Furthermore, the other cited references, Aztec Properties and Robbins, also fail to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties or Robbins teaches this element). As this element is a critical element of Appellants' independent claim 42, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claim 42 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

- e) *The cited references do not render claims 44-45 unpatentable*

Claims 44-45 depend from claim 42. Therefore, claims 44-45 include all of the limitations of claim 42. Accordingly, Appellants submit that claims 44-45 are patentable over the cited references for at least the same reasons discussed in detail in the previous section of this

Appeal Brief. Appellants hereby incorporate the above arguments for claim 42 into this section of the Appeal Brief. Furthermore, Appellants submit that claims 44-45 are patentable over the cited references for the additional reasons discussed below.

- (1) All the limitations of claims 44-45 are not taught or suggested by the references

Dependent claim 44 recites, "The financial instrument of claim 42, wherein said financial instrument comprises a debt instrument." Dependent claim 45 recites, "The financial instrument of claim 44, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account." Such features are nowhere taught or suggested in the cited art, taken alone or in combination.

- (a) The cited art does not teach or suggest a financial instrument comprising a debt instrument

The initial Office Action asserts that the elements of claims 44-45 involving a financial instrument comprising a debt instrument are disclosed in Youden at col. 1, lines 25-30 and 45-50. However, these excerpts from Youden merely relate to a calculator apparatus for calculating minimum principal amounts for deposit into selected term accounts. Thus, it cannot be said that these excerpts teach a financial instrument comprising a debt instrument.

As noted previously, the Youden patent merely concerns a *device* (more specifically, a calculator) that can be used to calculate a minimum principal payout into an account in order to achieve a desired payout of contracted dollars at a future time. In contrast, claims 44-45 teach a financial instrument that actually *incorporates* a debt instrument such as a bond or annuity account in providing for periodic adjustment of the principal component to account for the actual inflation that takes place in the future. Thus, while Youden is only concerned with a term account as one possible application upon which the actual invention, the calculator, can operate to achieve a desired payout of contracted dollars at a future time, the debt instrument in

claims 44-45 is actually *integrated* into the claimed financial instrument as the vehicle for earning interest that is systematically related to the actual inflation that takes place in the future in order to provide exact inflation protection on the purchasing power of the initial deposit.

To summarize on this issue, the Youden patent does not teach, either explicitly or inherently, a financial instrument comprising a debt instrument. Furthermore, the other cited references, Aztec Properties and Robbins, also fail to teach or suggest this claim element (although it should be noted that the Action does not assert Aztec Properties or Robbins teach this element). As this element is a critical element of Appellants' dependent claims 44-45, no *prima facie* case of obviousness has been made. Accordingly, Appellants request that the rejection of claims 44-45 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

D. Rejection of Claims 39 and 43 under 35 U.S.C. § 103(a)

1. Summary of the Rejection

The Final Action maintains a rejection of claims 39 and 43 under 35 U.S.C. § 103(a) as obvious over Youden, Aztec Properties, and Robbins in further view of U.S. Dept. of Labor. The Action takes the position that Youden, Aztec Properties, and Robbins when combined teach each of the elements of the claims except for the Consumer Price Index (CPI) comprising the Consumer Price Index for all urban consumers (CPI-U), and that U.S. Dept. of Labor provides this teaching. Appellants respectfully appeal this rejection.

2. Appellants' Remarks

a) The cited references do not render claim 39 unpatentable

Claim 39 depends from claim 38. Therefore, claim 39 includes all of the limitations of claim 38. Accordingly, Appellants submit that claim 39 is patentable over the cited references for the same reasons discussed in detail in the previous section of this Appeal Brief concerning

claim 38. Appellants hereby incorporate the above arguments for claim 38 into this section of the Appeal Brief. Accordingly, Appellants request that the rejection of claim 39 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

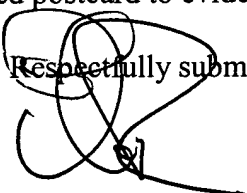
b) The cited references do not render claim 43 unpatentable

Claim 43 depends from claim 42. Therefore, claim 43 includes all of the limitations of claim 42. Accordingly, Appellants submit that claim 43 is patentable over the cited references for the same reasons discussed in detail in the previous section of this Appeal Brief concerning claim 42. Appellants hereby incorporate the above arguments for claim 42 into this section of the Appeal Brief. Accordingly, Appellants request that the rejection of claim 43 under 35 U.S.C. § 103(a) as being obvious over the cited references be withdrawn.

IX. CONCLUSION

Appellants have provided arguments that overcome the pending rejections. Appellants respectfully submit that the Office Action's conclusions that the claims should be rejected are unwarranted. It is therefore requested that the Board overturn the Action's rejections.

Please date stamp and return the enclosed postcard to evidence receipt of this document.

Respectfully submitted,


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Date: March 25, 2004



APPENDIX 1

PENDING CLAIMS

34. An inflation adjusted financial instrument comprising:
a principal component, the principal component being periodically adjusted for inflation based on the Consumer Price Index (CPI) to obtain an inflation-adjusted principal component;
an accrual component including an interest rate fixed for a term of the financial instrument;
wherein periodic interest payments are paid based on the inflation-adjusted principal component at the time said periodic interest payments are paid; and
wherein the inflation-adjusted principal component is payable at the end of the term.
35. The financial instrument of claim 34, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).
36. The financial instrument of claim 34, wherein said financial instrument comprises a debt instrument.
37. The financial instrument of claim 36, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.,
38. An inflation adjusted financial instrument comprising:
a principal component;
an accrual component having fixed and variable interest components payable periodically, said variable interest component being adjusted for inflation based on the Consumer Price Index (CPI); and
wherein the principal component is payable at the end of a term of the financial instrument.

39. The financial instrument of claim 38, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).
40. The financial instrument of claim 38, wherein said financial instrument comprises a debt instrument.
41. The financial instrument of claim 38, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.
42. An inflation adjusted financial instrument comprising:
a principal component;
an accrual component having fixed and variable interest components payable at the end of a term of the financial instrument, said variable interest component being adjusted for inflation based on the Consumer Price Index (CPI); and
wherein the principal component is payable at the end of the term of the financial instrument.
43. The financial instrument of claim 42, wherein said Consumer Price Index (CPI) comprises the Consumer Price Index for all urban consumers (CPI-U).
44. The financial instrument of claim 42, wherein said financial instrument comprises a debt instrument.
45. The financial instrument of claim 44, wherein said debt instrument comprises a bond, a certificate of deposit or an annuity account.

APPENDIX 2

EXHIBITS

Exhibit A – Youden *et al.*

Exhibit B – Aztec Properties

Exhibit C – Robbins

United States Patent [19]

Youden et al.

[11] 4,232,367

[45] Nov. 4, 1980

[54] APPARATUS FOR MAXIMIZING INTEREST EARNINGS AND PROVIDING PAYMENTS FROM PRINCIPAL WITHOUT INTEREST PENALTY

[76] Inventors: Robert H. Youden, 715 DeSoto Dr., Palo Alto, Calif. 94303; Charles S. Robertson, 1116 E. Rose Cir., Los Altos, Calif. 94022

[21] Appl. No.: 914,497

[22] Filed: Jun. 12, 1978

[51] Int. Cl.³ G06F 15/30

[52] U.S. Cl. 364/408; 364/415

[58] Field of Search 364/408, 415, 200, 900

[56] References Cited

U.S. PATENT DOCUMENTS

3,863,060	1/1975	Rode' et al.	364/715
3,946,218	3/1976	Rode' et al.	364/408
4,055,757	10/1977	Tillman et al.	364/715

Primary Examiner—David H. Malzahn

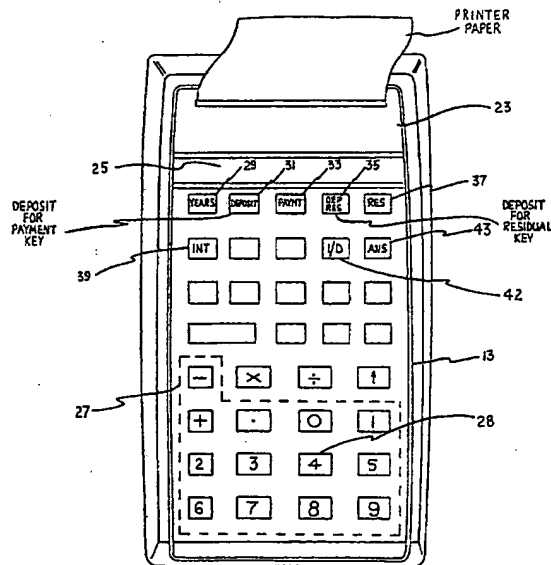
Attorney, Agent, or Firm—Robert S. Hulse; Roland I. Griffin

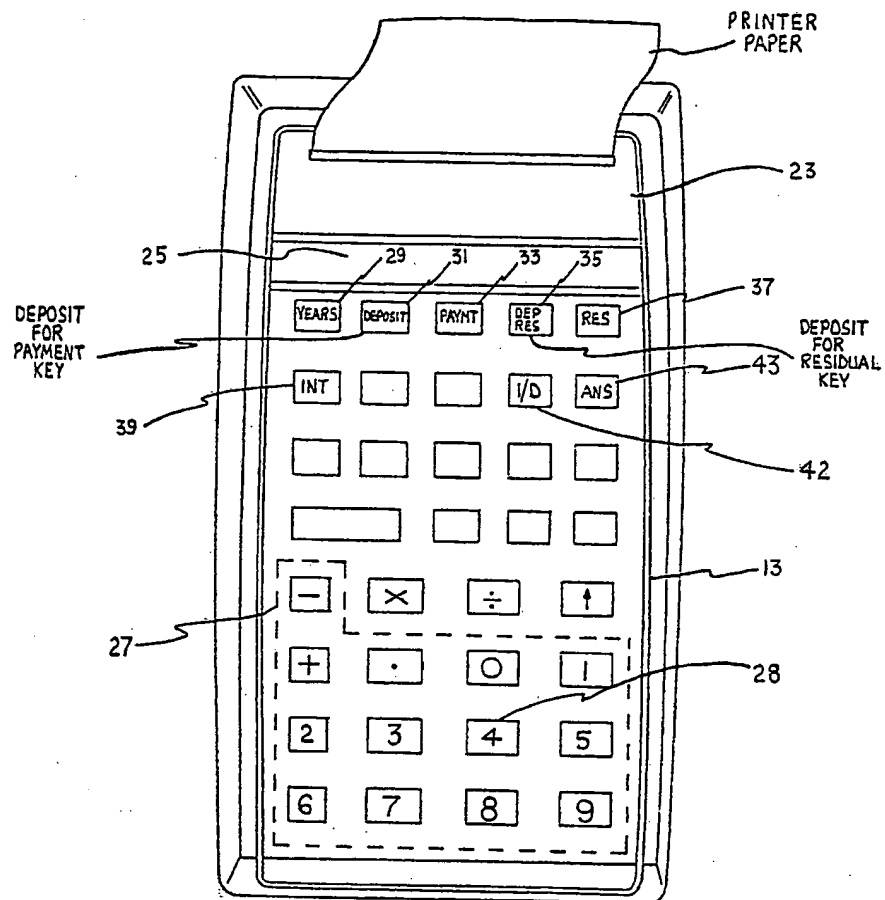
[57]

ABSTRACT

A calculator apparatus is provided for computing minimum principal amounts for deposit into demand (pass-book) accounts and into term (certificate-of-deposit) accounts paying interest at differing rates. The computed minimum principal amounts not only satisfy the minimum deposit requirements of the term accounts but, when deposited, provide both maximum interest earnings and payments from principal, without interest penalty ordinarily associated with early withdrawals. The apparatus comprises a keyboard, a read-write memory, a logic unit, a printer, and a display unit. The logic unit includes an arithmetic unit having a plurality of data storage registers and a read-only-memory with a stored program. The apparatus computes the minimum principal amounts in accordance with the stored program and in response to entered data.

6 Claims, 11 Drawing Figures





II

Figure 1

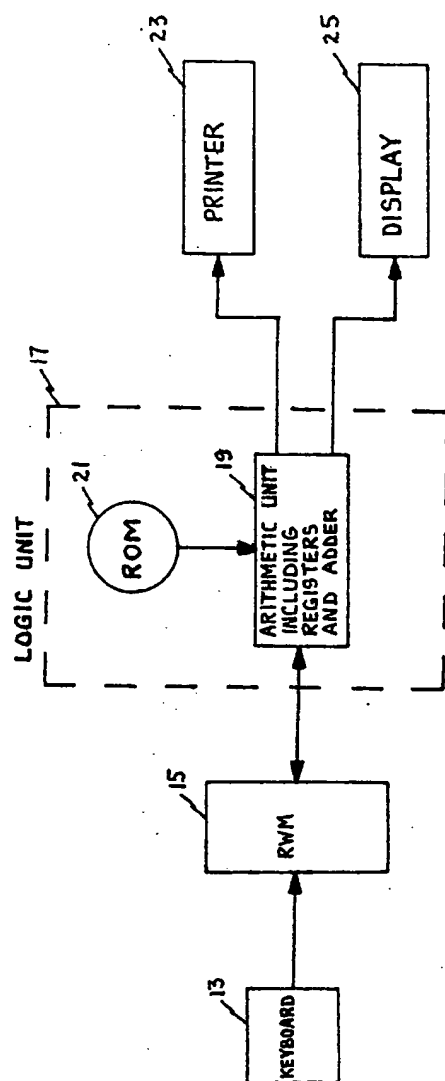


Figure 2

NO DESIRED PAYMENT AMOUNT SPECIFIED		\$300 PAYMENT SPECIFIED		TOTAL DEPOSIT OF \$10,000 SPECIFIED	
Term (4 years)	4. ***	Term (4 years)	4. ***	Term (4 years)	4. ***
Deposit for Residual	0.00 ***	Deposit for Residual	0.00 ***	Deposit for Residual	0.00 ***
Residual	8.00 ***	Residual	8.00 ***	Residual	8.00 ***
Interest Rate	7.50 ***	Interest Rate	7.50 ***	Interest Rate	7.50 ***
Term (3 years)	3. ***	Term (3 years)	3. ***	Term (3 years)	3. ***
Minimum Deposit	1000.00 ***	Minimum Deposit	2866.70 ***	Minimum Deposit	2263.81 ***
Monthly Payment	106.89 ***	Monthly Payment	300.00 ***	Monthly Payment	242.51 ***
Interest Rate	7.50 ***	Interest Rate	7.50 ***	Interest Rate	7.50 ***
Term (2 years)	2. ***	Term (2 years)	2. ***	Term (2 years)	2. ***
Deposit	1088.71 ***	Deposit	3053.68 ***	Deposit	2470.66 ***
Monthly Payment	106.89 ***	Monthly Payment	300.00 ***	Monthly Payment	242.51 ***
Interest Rate	7.00 ***	Interest Rate	7.00 ***	Interest Rate	7.00 ***
Term (1 year)	1. ***	Term (1 year)	1. ***	Term (1 year)	1. ***
Deposit	1173.49 ***	Deposit	3293.64 ***	Deposit	2662.42 ***
Monthly Payment	106.89 ***	Monthly Payment	300.00 ***	Monthly Payment	242.51 ***
Interest Rate	6.50 ***	Interest Rate	6.50 ***	Interest Rate	6.50 ***
Deposit	1145.40 ***	Deposit	3214.81 ***	Deposit	2598.71 ***
Monthly Payment	106.89 ***	Monthly Payment	300.00 ***	Monthly Payment	242.51 ***
Interest Rate	5.25 ***	Interest Rate	5.25 ***	Interest Rate	5.25 ***
Inflation Rate	0.00 ***	Inflation Rate	0.00 ***	Inflation Rate	0.00 ***
Total Deposit	4407.60 ***	Total Deposit	12370.82 ***	Total Deposit	10000.00 ***
Residual	8.00 ***	Residual	8.00 ***	Residual	8.00 ***
Total	4407.60 ***	Total	12370.83 ***	Total	10000.00 ***

Fig. 3A

Fig. 3B

Fig. 3C

<u>\$1000 DEPOSIT- FOR-RESIDUAL</u>		<u>RESIDUAL OF \$3000 REQUIRED</u>	
Term (4 years)	4. ***	Term (4 years)	4. ***
Deposit for Residual	1800.00 ***	Deposit for Residual	2222.52 ***
Residual	1349.82 ***	Residual	3088.60 ***
Interest Rate	7.50 ***	Interest Rate	7.50 ***
Term (3 years)	3. ***	Term (3 years)	3. ***
Minimum Deposit	1600.00 ***	Minimum Deposit	1800.00 ***
Monthly Payment	186.89 ***	Monthly Payment	186.89 ***
Interest Rate	7.50 ***	Interest Rate	7.50 ***
Term (2 years)	2. ***	Term (2 years)	2. ***
Deposit	1888.71 ***	Deposit	1888.71 ***
Monthly Payment	186.89 ***	Monthly Payment	186.89 ***
Interest Rate	7.00 ***	Interest Rate	7.00 ***
Term (1 year)	1. ***	Term (1 year)	1. ***
Deposit	1173.49 ***	Deposit	1173.49 ***
Monthly Payment	186.89 ***	Monthly Payment	186.89 ***
Interest Rate	6.50 ***	Interest Rate	6.50 ***
Deposit	1145.40 ***	Deposit	1145.40 ***
Monthly Payments	186.89 ***	Monthly Payments	186.89 ***
Interest Rate	5.25 ***	Interest Rate	5.25 ***
Inflation Rate	0.00 ***	Inflation Rate	0.00 ***
Total Deposit	4487.60 ***	Total Deposit	4487.60 ***
Residual	1800.00 ***	Residual	2222.52 ***
Total	5487.60 ***	Total	6630.13 ***

Fig. 3D

Fig. 3E

NO DESIRED PAYMENT AMOUNT SPECIFIED		\$106.89 STARTING PAYMENT PAYMENT SPECIFIED	
\$1000 DEPOSIT- FOR-RESIDUAL		6% INFLATION	
6% INFLATION		6% INFLATION	
Term (4 years)	4. ***	Term (4 years)	4. ***
Deposit for Residual	1000.00 ***	Deposit for Residual	1000.00 ***
Residual	1349.62 ***	Residual	1349.62 ***
Interest Rate	7.50 ***	Interest Rate	7.50 ***
Term (3 years)	3. ***	Term (3 years)	3. ***
Minimum Deposit	1000.00 ***	Minimum Deposit	1191.65 ***
Monthly Payment	106.89 ***	Monthly Payment	127.31 ***
Interest Rate	7.50 ***	Interest Rate	7.50 ***
Term (2 years)	2. ***	Term (2 years)	2. ***
Deposit	1027.08 ***	Deposit	1223.31 ***
Monthly Payment	100.84 ***	Monthly Payment	120.10 ***
Interest Rate	7.00 ***	Interest Rate	7.00 ***
Term (1 year)	1. ***	Term (1 year)	1. ***
Deposit	1044.40 ***	Deposit	1243.93 ***
Monthly Payment	95.13 ***	Monthly Payment	113.30 ***
Interest Rate	6.50 ***	Interest Rate	6.50 ***
Deposit	961.71 ***	Deposit	1145.44 ***
Monthly Payment	89.74 ***	Monthly Payment	106.69 ***
Interest Rate	5.25 ***	Interest Rate	5.25 ***
Inflation Rate	6.00 ***	Inflation Rate	6.00 ***
Total Deposit	4033.19 ***	Total Deposit	4803.73 ***
Residual	1000.00 ***	Residual	1000.00 ***
Total	5033.19 ***	Total	5803.73 ***

Fig. 3G

Fig. 3F

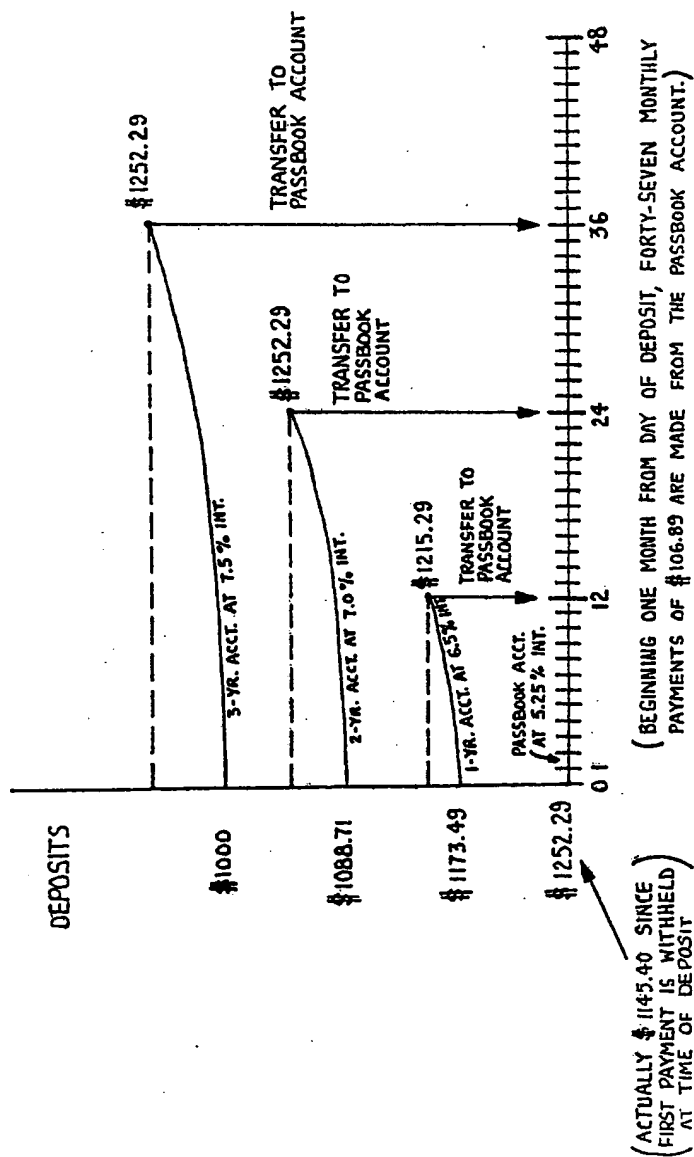


Figure 4

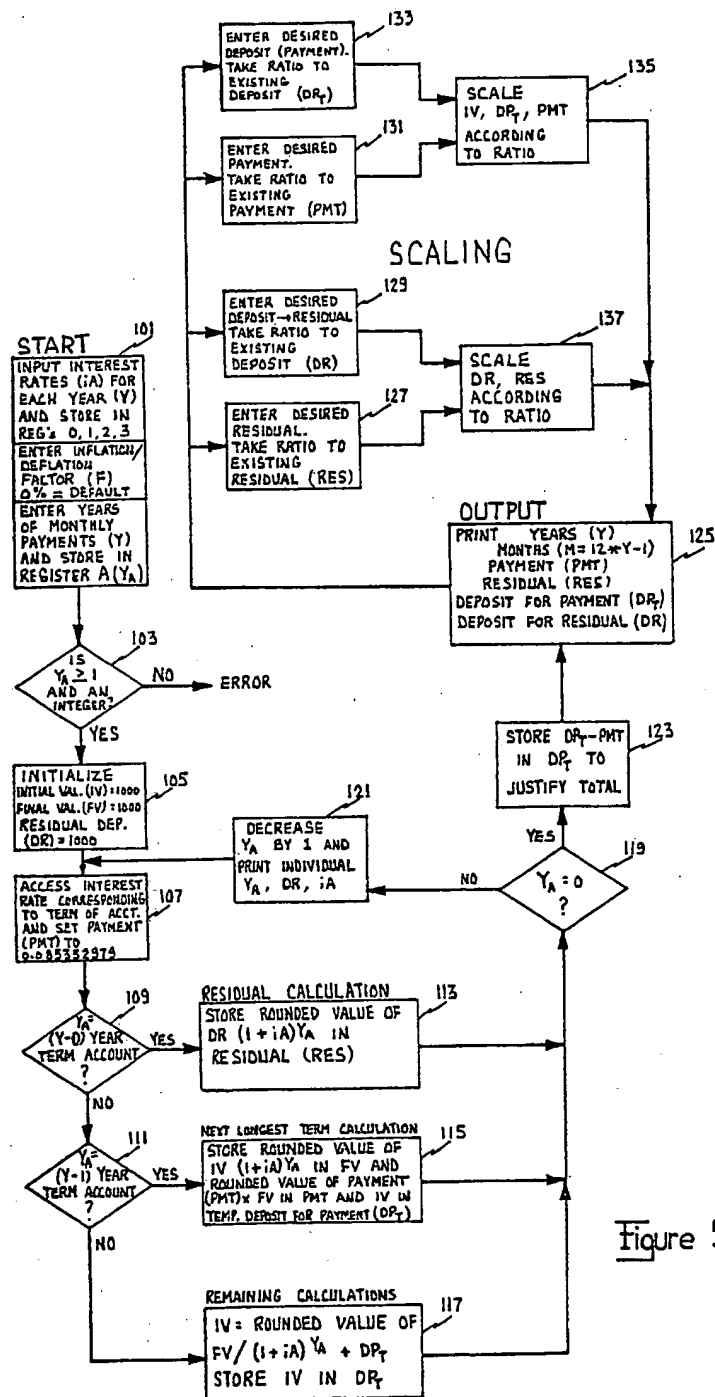


Figure 5

APPARATUS FOR MAXIMIZING INTEREST EARNINGS AND PROVIDING PAYMENTS FROM PRINCIPAL WITHOUT INTEREST PENALTY

BACKGROUND OF THE INVENTION

As the rate of inflation and, hence, the cost of living grows higher, the need to produce correspondingly higher earnings from one's investments grows greater, especially for persons who need, on a regular basis, a predetermined minimum income on which to live.

In calculating income levels or rates of return on one's investment, electronic calculators capable of performing annuity calculations are often used. For example, electronic calculators have been developed which are capable of performing present value (PV), future value (FV), payment (PMT), number of payments (N), and interest (I) calculations. One such device is shown and described, for example, in U.S. Pat. No. 3,863,060 entitled "General Purpose Calculator With Capacity For Performing Interdisciplinary Business Calculations," issued to Francé Rodé, et al., Jan. 28, 1975.

However, such electronic calculators do not provide a means for calculating minimum principal amounts which could be deposited (invested) in demand accounts and in term accounts (e.g., certificate-of-deposit bank accounts which provide substantial loss of interest upon withdrawal or depletion of principal) in such a manner as to provide both a high yield and the opportunity to periodically withdraw or make payments from the deposited amounts without incurring interest penalty.

What is needed, therefore, is a convenient calculating device (e.g., a desk-top, hand-held or other portable electronic calculating device) that is capable of calculating minimum principal which could be deposited in one or more accounts with depletion-of-principal penalties so as to provide both maximum interest and penalty-free payments.

SUMMARY OF THE INVENTION

In accordance with the illustrated preferred embodiment of the present invention, a calculator apparatus is provided for computing (calculating) minimum principal amounts for deposit into a passbook account and into selected term accounts to provide maximum interest earnings and regular monthly payments from principal without interest penalty, for a selected number of years. The apparatus comprises a keyboard, a read-write memory, a logic unit, a printer, and a display unit. The logic unit includes an arithmetic unit having a plurality of data storage registers and a read-only-memory with a stored program. The apparatus utilizes interest rates and minimum deposit amounts prescribed for the various accounts (said rates and amounts being pre-stored in ROM 21) and calculates therefrom, in accordance with the stored program and in response to entered data such as payment and number-of-years, the minimum principal amounts.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a top view of the calculator apparatus of the present invention.

FIG. 2 is a block diagram of the calculator of FIG. 1.

FIGS. 3A-3G are printed illustrations of output data produced by the calculator of FIG. 1.

FIG. 4 is a graphic representation of deposits into and payments from various term-and passbook-accounts utilized by the calculator of FIG. 1.

FIG. 5 is a flow chart of a program stored in the calculator of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIGS. 1 and 2, there is shown a calculator 11 having a keyboard or input means 13 for entering data, a read-write memory unit 15 for storing entered and processed data, and a logic unit 17 for processing the entered data and calculating minimum principal amounts therefrom. The minimum principal amounts may be deposited into a passbook savings account (i.e., a demand account) and into selected term accounts (certificate accounts) to earn maximum interest and provide periodic (e.g., monthly) payments from principal and interest without loss of interest (i.e., without incurring depletion-of-principal penalty) as demonstrated in the Appendix. The calculator 11 also includes a printer 23, and optional display unit 25 for printing and displaying, respectively, output data produced by logic unit 17. Logic unit 17 comprises an arithmetic unit 19, and a read-only memory unit (ROM) 21 with a stored program.

By depressing selected keys of keyboard 13, the user enters the number of years for which monthly payments (i.e., monthly withdrawals from his passbook account) are to be made. For example, by depressing key 28 and the YEARS key 29, the user enters the numeric quantity "4," representing the number of years that monthly withdrawals are to be made. The quantity "4" is then stored in memory 15 for later use. Thereafter, in response to depression of the ANS (answer) key 43 by the user, logic unit 17 accesses the entered data stored in memory 15 and calculates therefrom minimum principal amounts, which amounts may be deposited into selected term and passbook accounts to provide a desired monthly payment that is to be made over the selected period (four years). A printed list of these minimum principal amounts is shown in FIGS. 3A-3G. For example, FIG. 3A shows the quantities \$1000, \$1088.71, \$1173.49 and \$1145.40 as minimum principal amounts calculated by calculator 11 for deposit into a three-year term account, a two-year term account, a one-year term account, and a passbook account, respectively, to provide a \$106.89 monthly payment, for a period of four years. The printed list is produced via printer 23 (FIG. 2). Also printed on the list is a sum of the minimum principal amounts, this sum representing the total amount (e.g., \$4407.60) which must be deposited to provide the desired monthly payments of \$106.89.

As shown in FIGS. 3A-3G, accounts which are utilized by calculator 11 and in which minimal principal amounts may be deposited are among those which are generally available at a bank, such as:

1. a passbook account requiring no minimum deposit and providing interest at 5.25% per year, and from which principal and interest can be withdrawn without penalty
2. a one-year term account requiring a minimum deposit of \$1000 and providing interest at 6.5% per year, and from which no portion of the principal (the amount deposited) can be withdrawn before maturity (i.e., before the term of the account ends) without interest penalty (loss of interest)

3. a two-year term account requiring a minimum deposit of \$1000 and providing interest at 7.0% per year, and from which no portion of the deposited principal can be withdrawn before maturity without interest penalty

4. a three-year term account requiring a minimum deposit of \$1000 and providing interest at 7.5% per year, and from which no portion of the deposited principal can be withdrawn before maturity without interest penalty.

The interest rates of 6.5%, 7.0% and 7.5% per year represent the highest interest earnable from the one-, two- and three-year term accounts, where principal may not be depleted-without-penalty before maturity. The interest rate of 5.25% per year earnable from the passbook account represents the highest interest earnable from an account where principal may be depleted before maturity without penalty.

Data representing interest rates, length of term, and minimum-deposit amounts for the various accounts are prestored in ROM 21 (or, alternatively, may be entered via keyboard 13 or via a card reader or other entry device, and stored in RWM 15).

In providing the print-out shown in FIG. 3A (in response to entry of the numeral "4" followed by depression of the "YEARS" and "ANS" keys), logic unit 17 (FIG. 2) accesses the entered data from RWM 15 and prestored data from ROM 21, and calculates therefrom the minimum principal amounts that should be deposited in the passbook account and in the one-year, two-year and three-year term accounts to provide the minimum monthly payments.

As shown in FIG. 4, when a deposited principal amount matures at the end of the term of a term account, the matured amount (principal+interest) is transferred to the passbook account where monthly payments are made from principal and interest, without penalty.

In calculating the amounts that should be deposited in each account, logic unit 17 first selects the $(y-1)$ th year term account (i.e., the term account having a duration or term equal to $y-1$ years, y representing the desired period). For example, if $y=4$, the three-year term account would be selected, and the minimum amount depositable in said term account (e.g., \$1000) would be selected as a present or investment value quantity (IV) to be deposited in the account. Thereafter, a future value quantity (FV) is calculated, according to the following equations:

$$FV = IV(1+i)^y$$

where

IV = amount deposited = 1000.00

i = interest rate = $(1 + (0.075/360))^{360} - 1$

y = term of the account = 3

Thus, a deposit of \$1000 in the three-year term account (which account pays interest at the rate of 7.5% per year and which requires a minimum deposit of \$1000) would produce a future value of \$1252.29 in three years. At the termination of said three years (and the beginning of the fourth year), the matured amount (\$1252.29) would be transferred to the passbook account where principal and interest could be withdrawn (during the fourth year) without penalty.

To provide a similar transfer of funds (\$1252.29) from term to passbook account at the end of the second year and beginning of the third year, as shown in FIGS. 3A and 4, a deposit (IV) of \$1088.71 to the two-year ac-

count would be required. This deposit is calculated by logic unit 17 as follows:

$$IV = FV(1+i)^{-y}$$

where

FV = 1252.29

i = $(1 + (0.07/360))^{360} - 1$

y = 2

To provide for transfer of funds (\$1252.29) from term to passbook account at the end of the first year and beginning of the second year, as shown in FIGS. 3A and 4, a deposit (IV) of \$1173.49 to the one-year account would be required. This deposit is calculated by logic unit 17 as follows:

$$IV = FV(1+i)^{-y}$$

where

FV = 1252.29

i = $(1 + (0.065/360))^{360} - 1$

y = 1

To provide for payments or withdrawals during the first year, the amount \$1252.29 (actually \$1145.40, if the first-month's payment is withheld from the amount deposited) is deposited directly into the passbook account at the beginning of the first year.

Thus, by summing the individual amounts scheduled for deposit in the various accounts (\$1000 + \$1088.71 + \$1173.49 + \$1145.40), a minimum total of \$4407.60 is shown to be required to generate the minimum monthly payments over the period (number of years) selected. The monthly withdrawal or payment figure (PMT) may be calculated as follows:

$$PMT = (FV(1+i)^{11}(\hat{i})/(1+i)^{12} - 1) = 106.89$$

where

FV = \$1252.29 deposit

i = $(1 + (0.0525/360))^{30} - 1$

360 represents the number of days per year

30 represents the number of days per month

0.0525 represents passbook annual interest rate

11 represents the number of months of the first year (for which payments are to be made) less the first month (the payment for the first month having been withheld at the time the deposit was made)

12 represents the number of months per year.

In the event the calculated monthly payment amount (PMT) is too small or too large to satisfy a payee's monthly needs, the amount may be changed by entering, via selected ones of the numeric keys 27 (FIG. 1), the desired new payment amount, then pressing the PMT key. This entry operation causes logic unit 17 to multiply the previously calculated payment value (PMTOLD) by a constant (ratio) equivalent to PMTNEW/PMTOLD, where PMTNEW is the monthly payment amount that is desired by the individual. For example, if a monthly payment of \$300.00 was desired, the quantity "300.00" would be entered into the calculator 11 and stored in RWM 15 upon activation of the appropriate numeric keys 27, followed by activation of the PMT key. In which event, the minimum deposits to the various term and passbook accounts would be \$2806.70, 3055.68, 3293.64 and 3214.81 as shown in FIG. 3B. Alternatively, the total deposit may be increased from a previous value (e.g., from \$4407.60 as shown in FIG. 3A) to some desired value (e.g., to

\$10,000 as shown in FIG. 3C) to provide an increase in monthly payment (e.g., from \$106.89 as shown in FIG. 3A, to \$242.51 as shown in FIG. 3C). The desired deposit is entered by activating appropriate ones of the numeric keys 27, followed by activating the DEPOSIT 5 key 31.

To deposit a selected amount into a term account (generally into the longest term account paying the highest interest rate) for the purpose of creating a residual (not for producing payments), selected ones of keys 27 are depressed, followed by depression of the deposit-to-residual key 35. For example, as shown in FIG. 3D, the \$1000.00 deposited to the residual causes the residual to grow from \$0 (as shown in FIG. 3A) to \$1349.82 (as shown in FIG. 3D), and the total deposit of \$4407.60 15 (as shown in FIG. 3A) to increase to \$5407.60 (as shown in FIG. 3D).

To determine the amount that must be deposited to the residual to accrue to or produce a desired residual amount at the end of the payment period, the desired 20 residual amount is entered via keys 27, after which, the RES key 37 is depressed. For example, to produce or accrue a residual of \$3000 at the end of a four-year payment period as shown in FIG. 3E, the quantity "3000" is entered via keys 27, after which, the RES key 37 is depressed. Logic unit 17 then calculates the amount to be deposited (e.g., 2222.52, as shown in FIG. 3E).

To include the effects of inflation or deflation in the calculations, monthly payments may be increased or 30 decreased each year by a selected percentage. For example, if it is desired that the payments reflect a yearly inflation rate of six percent as shown in FIG. 3F, the user enters the numeric quantity "6.00" by depressing appropriate ones of keys 27 followed by depressing the inflation/deflation (I/D) key 42. If the entered numeric quantity is positive, the monthly payments are increased (inflated) each year by the percentage (e.g., 6%) specified. If the entered numeric quantity is negative, the monthly payments are decreased (deflated) each year 40 by the specified percentage.

In addition to specifying a yearly inflation or deflation factor, the user may specify a desired minimum monthly payment. For example, as shown in FIG. 3G, monthly payments starting at \$106.89 and increasing by 6% each year thereafter may be specified by the user 45 upon actuation of appropriate ones of keys 27 and actuation of the PMT key 33.

The foregoing describes output information produced by calculator 11 (as shown in FIGS. 3A-3G), in response to entered data. The manner in which calculator 11 produces this output information is described following, and shown in FIG. 5. The program shown in Table 1 is stored in ROM 21. As shown in FIGS. 2 and 5, arithmetic unit 19 of logic unit 17 operates in accordance with this stored program in computing the output values shown in FIGS. 3A-3G.

Block 101 of FIG. 5 shows the entry of interest rate information, deflation factor information, and desired-years-of-monthly-payments information into selected 60 registers of calculator 11. Thereafter, as shown in block 105, variables such as residual, final or future value, and present or initial value (corresponding to the minimum deposit required to utilize a given term account) are set or initialized to a predetermined value (e.g., 1000). 65 Block 107 shows the selection of an initial payment rate, and the accessing of an interest rate value corresponding to a given term account (e.g., the accessing from

ROM 21 of the interest rate value of 7.5 corresponding to the three-year term account). The interest rate values of 5.25, 6.5, 7.0 and 7.5 are pre-stored in ROM 21 and accessed by arithmetic unit 19 in preparation for computation. Blocks 109 and 113 show the calculation of residual value (RES) for the longest-year period (e.g., the fourth-year period). Blocks 111 and 115 show the calculation of FV corresponding to the future value produced, from the minimum \$1000 deposit, for the next-longest term account (e.g., the three-year term account). As shown by blocks 111 and 117, for shorter-period term accounts (e.g., two-year and one-year term accounts), a present or investment value IV is calculated based upon the previously calculated FV, and stored in register DP7. These calculated values are later printed (via printer 23), as shown by block 125. In the event a desired residual, deposit-to-residual, payment, or deposit-to-payment is entered (as shown in blocks 127-133), the calculated values are adjusted or scaled as shown in blocks 135, 137, and the adjusted values are printed, as shown by block 125.

As shown in FIG. 5, and in the individual program instructions listed in Table 1 following, the registers of calculator 11 utilized by the program are 0-3, A, RES, FV, PMT, TEMP, DP7, Y, M and DR.

TABLE 1

001	RTN	059	*LBL0
002	*LBL0	060	ROL1
003	1	061	ROL9
004	X=Y	062	Y
005	%	063	F1?
006	+	064	GTO1
007	STO4	065	F2?
008	R/S	066	GTO2
009	*LBL0	067	RCLC
010	RCLA	068	RCL4
011	1	069	+
012	+	070	STOC
013	STO9	071	R J
014	CFO	072	RCL7
015	GTO0	073	RCL4
016	*LBLA	074	+
017	STOA	075	STO7
018	1	076	X=Y
019	X>Y?	077	+
020	GTOa	078	RCLB
021	+	079	X=Y
022	STO9	080	+
023	ENT	081	STOB
024	INT	082	LSTX
025	X≠Y?	083	RND
026	GTOa	084	ST+5
027	P=S	085	GTO3
028	RCL7	086	*LBL1
029	P=S	087	RCLD
030	STO6	088	X
031	STOD	089	STOE
032	SF0	090	STOC
033	*LBL0	091	CF1
034	SF1	092	RCLD
035	SF2	093	GTO3
036	0	094	*LBL2
037	STO1	095	RCL6
038	P=S	096	X
039	RCL8	097	STO7
040	P=S	098	P=S
041	STO8	099	RCL9
042	*LBL9	100	P=S
043	1	101	X
044	ST-9	102	STOC
045	*LBL8	103	RCL6
046	RCL9	104	STOB
047	RCL8	105	RND
048	INT	106	STO5
049	X≠Y?	107	*LBL3
050	GTO0	108	RCL9
		109	GTO4

TABLE 1-continued

051	RCL8	110	*LBL7
052	FRC	111	BRG
053	EEX	112	PSE
054	2	113	R/S
055	X	114	*LBL4
056	STOB	115	X≠0?
057	ISZI	116	GTOO
058	GTO8	117	R ↓
118	ST-5		
119	RCLB		
120	RCLC	177	RCLD
121	—	178	X=Y
122	STOB	179	X
123	RND	180	STOD
124	RCL5	181	RCLE
125	—	182	LSTX
126	F07	183	X
127	GTO6	184	STOE
128	PRTX	185	R/S
129	RCLC	186	*LBLb
130	PRTX	187	DSP0
131	P=S	188	RCLA
132	RCL5	189	PRTX
133	P=S	190	P=S
134	PRTX	191	RCL6
135	SPC	192	P=S
136	GTO6	193	X
137	*LBL0	194	↓
138	F07	195	—
139	GTO9	196	PRTX
140	DSP0	197	STOI
141	PRTX	198	DSP2
142	DSP2	199	SPC
143	R ↓	200	↓
144	PRTX	201	RCL4
145	RCLC	202	% CH
146	PRTX	203	PRTX
147	R=S	204	RCLC
148	RCLI	205	PRTX
149	P=S	206	RCLE
150	PRTX	207	PRTX
151	SPC	208	SPC
152	GTO9	209	RCLB
153	*LBLB	210	PRTX
154	RCLB	211	RCLD
155	GTOO	212	PRTX
156	*LBLC	213	+
157	RCLC	214	PRTX
158	*LBL0	215	SPC
159	+	216	SPC
160	STX6	217	GTO7
161	RCLB	218	R/S
162	X=Y		
163	X		
164	STOB		
165	LSTX		
166	RCLC		
167	X		
168	STOC		
169	R/S		
170	*LBLD		
171	RCLD		
172	GTOO		
173	*LBLB		
174	RCLE		
175	*LBL0		
176	+		
177	RCLD		

II. Penalty can be avoided by having a term account mature on or before each payment date.

a. If the account matures on the payment date then there is just one single account (since any other maturing on that date can be combined with it).

b. If the account matures before the payment date then there can be two or more accounts, running sequentially.

III. The choice between using one account or two or more accounts is made by determining which gives the desired payment with the minimum principal amounts for deposit.

IV. The relationship between the amount deposited in an account and the final value of the account is given by:

$$FV = PV(R)(1+i) \quad (1)$$

where

FV is the final value of the account

PV is the amount deposited

R is the ratio of the amount transferred from the account to the amount available

i is the interest rate per period

n is the number of compounding periods

V. Solving for PV, the principal amount for deposit:

$$PV = FV(R)/(1+i)^n \quad (2)$$

VI. For a given FV(R), PV will be a minimum when the quantity

$$(1+i)^n \text{ is maximum.} \quad (3)$$

VII. The relationship between the amount deposited in a group of accounts running sequentially and the final value of the group is given by:

$$FV = PV(R_1)(R_2) \dots (R_k)(1+i)^{n_1}(1+i)^{n_2} \dots (1+i)^{n_k} \quad (4)$$

where

FV is the final value of the group

PV is the initial amount deposited

R₁, R₂, ..., R_k are the ratios of the amount transferred to the next account to the amount available

i₁, i₂, ..., i_k are the interest rates

n₁, n₂, ..., n_k are the compounding periods

The order in which the accounts are used is from left to right in the equation.

VIII. Solving for PV, the principal amount for deposit:

$$PV = FV(R_1)(R_2) \dots (R_k)/(1+i)^{n_1}(1+i)^{n_2} \dots (1+i)^{n_k} \quad (5)$$

IX. For a given FV(R₁)(R₂) ... (R_k), PV will be a minimum when the quantity

$$(1+i)^{n_1}(1+i)^{n_2} \dots (1+i)^{n_k} \text{ is maximum.} \quad (6)$$

X. Any other sequence or order of this series of accounts, such as:

$$PV(R_2) \dots (R_k)(R_1)(1+i)^{n_2} \dots (1+i)^{n_k}(1+i)^{n_1} \quad (7)$$

will always have a product equal to FV (by the Commutative Law of Algebra, which states that the result of a product is independent of the order in which the elements of the product are taken).

APPENDIX

I. Draw Regular Periodic Payments: From what kind of account?

a. Term accounts because of higher interest rates.

b. But present regulations require a substantial penalty for early withdrawal of funds from a term account.

XI. In the comparison of the single account to the two or more accounts it is necessary to compare to all possible sequences of the two or more accounts. However, a comparison to one sequence such as (4) above will suffice because all other products are identical.

XII. To compare the maximum interest earnings of the single account to the two or more accounts let:

$$PV(R1)(R2) \dots (Rk) = PV(R), \quad (8)$$

$$i = i1, i2, \dots, ik = I \quad (9)$$

(all the interest rates the same), and

$$n = n1 + n2 + \dots + nk \quad (10)$$

(all the accounts run consecutively).

XIII. The final value of the two or more accounts is:

$$FV = \frac{PV(R)(1 + I)^{n1}(1 + I)^{n2} \dots (1 + I)^{nk}}{PV(R)(1 + I)^{n1+n2+\dots+nk}} = PV(R)(1 + I)^n \quad (11)$$

XIV. The final value of the single account is, from Equation (9)

$$FV = PV(R)(1 + I)^n \quad (12)$$

XV. Since (11) is equal to (12) the accumulated earnings of two or more accounts of the same interest rates running consecutively for a given length of time will be identical to a single account for that same time and rate of interest.

XVI. In the Savings and Loan and Banking industries, accounts that have comparable minimum deposit requirements pay lower interest rates for those accounts that have shorter terms to maturity. Therefore, one of the values of I would have to be smaller by some amount. In any account, say for example the first one,

let the new value of

$$I = I - d \quad (13)$$

XVII. The earnings for the two or more accounts and the single account are:

$$FV = PV(R)(1 + I - d)^{n1}(1 + I)^{n2} \dots (1 + I)^{nk} \quad (14)$$

$$FV = PV(R)(1 + I)^{n1}(1 + I)^{n2} \dots (1 + I)^{nk} \quad (15)$$

When the earnings are compared, all the factors are equal except that

$$(1 + I - d)^{n1} < (1 + I)^{n1} \quad (16)$$

Therefore no combination of shorter term accounts, with at least one lower interest rate, can equal the earnings of one single account running for the sum of the terms of the two or more accounts. The maximum earnings are achieved with one single account instead of a plurality of accounts, and each account is entirely independent of any other.

XVIII. Let the total of the minimum principal amounts be the sum of the independent individual minimum amounts.

$$PVt = PV1 + PV2 + \dots + PVk \quad (17)$$

Assume that PVt is less by some amount e , then

$$PVt - e = PV1 + PV2 + \dots + PVk - e \quad (18)$$

But this is not possible since some PV on the right side of Equation (18) would have to be smaller by e , and this is not possible because each PV is already at a minimum. Therefore, the total of the minimum principal amounts is itself a minimum, and provides maximum interest earnings.

IXX. In the practical case, where accounts mature yearly, and payments are desired monthly, the funds necessary to carry the payments over the year are placed in an interim penalty-free passbook account. This apparatus gives the maximum possible earnings by following the above procedure in the internal calculations, including the passbook feature.

We claim:

1. Calculator apparatus for determining minimum principal amounts depositable into passbook and term accounts having pre-determined interest rates and minimum deposit requirements to provide maximum interest earnings and payments from principal without interest penalty, the apparatus comprising:

keyboard means having a plurality of keys for entering data including keys for entering a selected number of years and a key for initiating minimum principal calculations;

first memory means coupled to the keyboard means for storing entered data;

logic means coupled to the first memory means and including a second memory means having a program, the predetermined interest rates and the minimum deposit requirements stored therein for calculating, under control of the stored program and in response to actuation of the key for initiating minimum principal calculations, minimum principal amounts in accordance with the predetermined interest rates, the minimum deposit requirements and the number of years and payment amount selected, the minimum principal amounts being depositable into the passbook and term accounts to provide maximum interest earnings and payments from principal without interest penalty; and printer means coupled to the logic means for printing the calculated minimum principal amounts.

2. The calculator apparatus as in claim 1 wherein the keyboard means includes a key operable with selected ones of the keys for entering data to specify a desired payment.

3. The calculator apparatus as in claim 1 wherein the keyboard means includes a key operable with selected ones of the keys for entering data to specify a deposit for use in providing a desired payment.

4. The calculator apparatus as in claim 1 wherein the keyboard means includes a key operable with selected ones of the keys for entering data to specify a deposit for use in creating a desired residual.

5. The calculator apparatus as in claim 1 wherein the keyboard means includes a key operable with selected ones of the keys for entering data to specify a desired residual that is to be produced at the end of the selected number of years.

6. The calculator apparatus as in claim 1 wherein the keyboard means includes a key operable with selected ones of the keys for entering data to specify an inflation percentage factor by which the payments are to be adjusted.

* * * * *

LEXSEE 530 S.W.2D 756

**AZTEC PROPERTIES, INC., Appellant, v. UNION PLANTERS NATIONAL BANK OF
MEMPHIS, Appellee**

[NO NUMBER IN ORIGINAL]

Supreme Court of Tennessee

530 S.W.2d 756; 1975 Tenn. LEXIS 566

October 27, 1975

SUBSEQUENT HISTORY: [1]**

Reported at: 530 S.W.2d 756 at 761.

LexisNexis (TM) HEADNOTES- Core Concepts:**COUNSEL:**

Larry D. Austin, Pete Sisson, Sisson, McWhirter, Lowrance & Austin, Memphis, for appellant.

Edward P. Russell, Jr., Robert M. Johnson, Canada, Russell & Turner, Memphis, for appellee.

JUDGES:

Brock, Justice wrote the opinion. Fones, C.J., and Cooper, Henry and Harbison, JJ., concur.

OPINIONBY:

BROCK

OPINION:

[*757] This is an action to recover on a promissory note. The facts are stipulated.

On July 12, 1974, Aztec Properties, Inc., executed a promissory note payable to Union Planters National Bank of Memphis in exchange for a \$50,000.00 loan. The promisor agreed to pay the promisee \$50,000.00, "in constant United States Dollars adjusted for inflation (deflation)" with interest at ten percent per annum. The adjusted principal was to be calculated according to a formula contained in the note, to wit:

"Amount of principal due shall equal the amount of original principal multiplied by the consumer price index adjustment factor. This adjustment factor shall be computed by dividing the consumer price index at maturity by the consumer price index on date of

borrowing. Said consumer price index numbers shall be for the most recent month [**2] available preceding borrowing and maturity dates. This consumer price index shall be the index not seasonably adjusted for all items as reported by the United States Department of Labor."

On maturity of the note Aztec Properties repaid to the bank \$50,000.00, with discounted interest at the rate 9.875 percent, in the amount of \$419.35 (which is an effective yield of 9.96% per annum), but the borrower refused to pay the additional "indexed principal" of \$500.00, based on the inflation adjustment formula.

Whereupon, the bank sued Aztec Properties in Chancery Court for the "indexed principal" together with interest from maturity at the rate of ten percent per annum. Both parties filed Motions for Summary Judgment, the Chancellor holding in favor of the bank. Aztec Properties now appeals to this Court alleging that the Chancellor erred in granting the bank's Motion and in denying its own.

The first issue to be resolved is whether this note is usurious, i.e., whether it charges interest in excess of the legal rate of ten percent per annum. *T.C.A. § 47-14-104*. A defendant sued for money may avoid the excess over legal interest, by a plea setting forth the amount of the usury. [**3] *T.C.A. § 47-14-112*. Interest includes all compensation for the use of money. "Any payment to the lender in addition to the rate of interest legally permissible, whether called by the name of bonus or commission or by any other name, is usurious." *Restatement, Contracts*, § 526. Compensation is determined not by what the borrower pays but by what the lender receives; thus, if the borrower is the beneficiary of a payment it will not be interest. *Silver Homes, Inc. v. Marx & Bensdorf, Inc.*, 206 Tenn. 361, 333 S.W.2d 810 (1960). Nor are expenses incident to making a loan and furnishing the lender with satisfactory security for its repayment compensation

530 S.W.2d 756, *757; 1975 Tenn. LEXIS 566, **3

or interest. *Silver Homes, Inc. v. Marx & Bendorf, Inc.*,
supra.

cent interest on its face; that interest has been paid and is
not in issue

The note executed by Aztec Properties bears ten per-

[*758] here. The borrower claims that the "indexed principal" constitutes additional interest. The bank argues that the "indexed principal" equals the difference in value between the principal lent and returned, and is not extra compensation.

There being no Tennessee case law directly on point, both parties attempt [*4] to analogize the long series of "exchange of money" cases.

One of the earliest of these cases was *Lawrence v. Morrison*, 9 Tenn. 444 (1830). In that case the borrower gave a note to Sullivan for \$607.87 1/2 in Tennessee bank notes, payable on December 25, 1825. Sullivan assigned the note to Lawrence. On December 24, 1825, the borrower executed a second note in exchange for the first note for the same sum payable in gold and silver on August 1, 1825 [sic]. After the second note fell due a suit was instituted to which the borrower plead usury averring that that \$607.00 in bank notes was worth only \$456.00 specie. The Court set guidelines for determining usury:

"A jury in trying the case before us would . . . first enquire what was the value of the bank notes on the day the second note was given. If the sum found, compared with the amount of the note given for specie, fell so far short as to show that more than the rate of six per cent. per annum had been reserved, they might then infer that the whole amount was a device to cover usury. . . . In short, it would be for the jury to ascertain whether under all the circumstances, it was intended by the parties under color [*5] of supposing depreciated paper equal to specie, to cover a corrupt bargain against the statutes concerning usury." *Id.* at 446.

In *Weatherhead v. Boyers*, 15 Tenn. 545 (1835), Weatherhead borrowed a sum in Tennessee bank notes from Boyers and agreed to repay an equal nominal amount in specie or notes on the Bank of the United States. The

latter were equal to gold or silver while the former were greatly under par. The Court looked beyond the devices and disguises of the parties to the substance of the transaction and found usury.

The Court reached the opposite result in *Turney v. State*, 24 Tenn. 407 (1844). In that case a contractor with the post office had an arrangement with the bank whereby he deposited eastern funds and gold and silver and received Tennessee bank notes of equal face value in exchange. The later were only worth 92-93% of the former. The contractor also had the privilege of borrowing additional money from the bank up to twice the amount of his funds. Although the difference in value between the eastern funds and specie, on one hand, and the Tennessee bank notes, on the other, exceeded the legal maximum interest at that time (6%), the Court found no [*6] usury because the parties had no corrupt intentions. It pointed out that the notes received by the contractor "were notes of specie-paying banks, as sound or available, perhaps, to him and to others, in ordinary transactions, as eastern funds." *Id.* at 409.

The Court in *Turney v. State*, *supra*, relied heavily upon *United States v. Waggener*, 34 U.S. 378, 9 Pet. 378, 9 L. Ed. 163 (1835). In *Waggener*, the borrower executed a promissory note for \$5,000.00 and 6% interest per annum payable to the Bank of the United States in exchange for which he received \$5,000.00 in Kentucky bank notes. At the time of the loan the Kentucky bank notes were circulating at a rate of thirty-three to forty percent depreciation below their nominal amounts. In response to the claim of usury the United States Supreme Court stated, "to constitute usury within the prohibitions of the law, there must be an intention knowingly to contract for or to take usurious interest; for if neither party intend it, but act bona fide and innocently, the law will not infer a corrupt agreement." *Id.* at 171. The Court concluded that the loan in *Waggener* was not per se illegal because the Kentucky bank notes might [*7] have been worth more to the parties than their marketable value at the time of the loan. If the parties bona fide estimate

[*759] equivalent values in the credits or commodities they are exchanging, there is no usury, said the Court.

In *Hamilton v. Moore*, 26 Tenn. 35 (1846), the complainant borrowed a sum of money in Alabama bank notes and sometime afterwards bound himself by a bill single to repay the face value of the loan in Tennessee bank notes. He later claimed that the bill single was usurious because Alabama bank notes were worth less than those of Tennessee. The parties agreed that they did not intend to commit usury and that the borrower said at the time that Alabama notes would be as valuable to him as Tennessee money. The Court relying on *Turney v. State*, *supra*, found no usury. It stated that "usury is not an inference of law, to be drawn from the mere inequality of value between the currency loaned and that stipulated to be paid for it, but, on the contrary, is a question of intention, to be made out by the proof of facts." *Id.* at 36.

In *Finley v. McCormick*, 53 Tenn. 392 (1871), the complainant lent the borrower \$200.00 in gold, \$150.00 in silver, [**8] and \$200.00 in greenbacks or United States currency, and the latter agreed to pay back the gold and silver or to pay \$1.50 for every dollar in gold, and the difference in value of silver. The borrower argued that this was usurious. The Court concluded that it could "not judicially know the value of 'greenbacks,' so called, and for ought that appears on the face of the bill, the parties may have fairly estimated the difference in value between them and gold and silver, and the contract is, *prima facie*, lawful." *Id.* at 394.

Finally in *In re Mansfield Steel Corporation*, 30 F.2d 832 (E.D.Mich. 1929), a Canadian resident lent a Michigan corporation \$88,000.00, primarily in Canadian money. The corporation in exchange executed a promissory note for that amount in American funds plus the maximum legal interest in Michigan. At the time of the loan Canadian money was worth less than American money, but the parties anticipated they would be at par by the

time of repayment. Evidence of the parties' expectations was an important factor in the court's decision that they lacked the intention to lend money at usurious interest.

In our view these cases are fundamentally different from [**9] the case under consideration here. With the exception of the last case all occurred in a very particular historical context; they were decided at a time when different kinds of money with different values were in circulation. Faced with the problem of the interchange of this money the court concluded that usury should be ascertained according to the parties' intentions; thus, when the moneys exchanged pursuant to a loan are *different in kind* but *equal in value* in the honest judgment of the parties, the courts will not assume that a difference in their market value is hidden interest. It is important to note that except for *Mansfield*, *supra*, equality of value was evaluated in these cases as of the time of the loan or agreement to repay; in no case was the sum owing adjusted at the time of repayment according to fluctuations in value of the principal after it was lent. And in *Mansfield* the parties merely considered the projected fluctuation in value of the currency of repayment, not appreciation or depreciation in value of the principal loaned.

We have found no case holding that an intentional increase in the face value of the principal to account for inflation does [**10] not constitute interest. In practice the lender has long borne the risk of inflation in this state. The interest charged by a lender is not profit, strictly speaking, but compensation for the use of money and for bearing the risk that the borrower might not repay or the principal might depreciate in value. We accordingly hold that the "indexed principal" constitutes usurious interest.

The next question raised is whether the defense of usury, provided in T.C.A. § 47-14-112, is available to corporate borrowers. The usury statutes of many states exempt corporations from their protection.

[*760] See Hershel Shanks, *Practical Problems in the Application of Archaic Usury Statutes*, 53 *Va.L.Rev.* 327 at 346 et seq. (1967). Tennessee, however, has never adopted such a statute nor have its courts recognized a corporate exclusion. But the Bank argues that the Legislature has granted corporations organized under Tennessee law the right to borrow at whatever interest rate they choose. T.C.A. § 48-402 provides:

"Each corporation shall have power:

"(g) To make contracts and, subject to such limitations, if any, as may be contained in the charter, to incur liabilities, [**11] *borrow money at such rates of interest as the corporation may determine*, issue its notes, bonds and other obligations, and secure any of its obligations by mortgage, pledge or otherwise."

In our opinion this statute merely enables corporations to borrow money at such rates as are *permitted by law*. The Legislature has no power to authorize corporations to lend or borrow at any interest rate exceeding the uniform and equal rate fixed by general law. *McKinney v. Memphis Overton Hotel Company*, 59 *Tenn.* 104 (1873). Nor can this rate exceed ten percent per annum. *Constitution of Tennessee*, Article 11, § 7.

Aztec Properties executed a written waiver of the defense of usury at the time the note was signed, and the Bank relies upon this waiver. We find no merit in this argument because the consent or cooperation of the one paying the usurious interest is immaterial. *Providence A.M.E. Church v. Sauer*, 45 *Tenn.App.* 287, 323 *S.W.2d* 6 (1958).

Even if the "indexed principal" were not considered to be interest, we are of the opinion that as employed in this case the device of an "indexed principal" could not withstand analysis under the Joint Congressional Resolution [**12] of June 5, 1933, popularly referred to as the "Gold Clause" Resolution.

Congress made its intention extremely clear in this resolution, in which it stated:

"Every obligation, heretofore or hereafter incurred, whether or not any such provision is contained therein or made with respect thereto, shall be discharged upon payment, dollar for dollar, in any coin or currency which at the time of payment is legal tender for public and private debts." 31 *U.S.C.A.* § 463.

We are not concerned in this case with the exchange of currencies upon an international market, nor does the case involve the sale of any commodity. In this case a domestic customer borrowed funds from a national bank in a principal amount expressed in and repayable in United States dollars. It would be contrary to the national policy, as expressed by the Congress and as interpreted in several cases by the United States Supreme Court, to permit a lender to require of a borrower a different quantity or number of dollars from that loaned, insofar as the principal amount is concerned. In *Guaranty Trust Company, Trustee v. Henwood, Trustee et al.*, 307 *U.S.* 247, 252, 59 *S. Ct.* 847, 850, 83 *L. Ed.* 1266 (1939), [**13] the United States Supreme Court said:

"Having thus unmistakably stamped illegality upon both outstanding and future contractual provisions designed to require payment by debtors in a frozen money value rather than in a dollar of legal tender current at date of payment, Congress — apparently to obviate any possible misunderstanding as to the breadth of its objective — added, with studied precision, a catchall second sentence sweeping in 'every obligation', existing or future, 'payable in money of the United States', irrespective of 'whether or not any such provision is contained therein or made with respect thereto.' The obligations hit at by Congress were those 'payable in money of the United States.' All such obligations were declared dischargeable 'upon payment, dollar for dollar, in any coin or currency [of the United States]

[*761] which at the time of the payment is legal tender for public and private debts."

See also *Norman v. Baltimore & Ohio Railroad Company*, 294 U.S. 240, 55 S. Ct. 407, 79 L. Ed. 885 (1935); *Holyoke Water Power Company v. American Writing Paper Company*, 300 U.S. 324, 57 S. Ct. 485, 81 L. Ed. 678 (1937).

Accordingly, even if the [**14] reserved interest in the present case were only five percent, or some other rate clearly free from any question of usury, we are of opinion that a national or state banking institution would not be authorized to "index" the principal amount of money loaned to a domestic customer on a promissory note, so as to vary the number of dollars which may be required to be paid in satisfaction of the debt.

It is recognized, of course, that "indexing" is a current

and very legitimate concept in modern business transactions. Nothing in this opinion should be taken to suggest that there is an impropriety in measuring future rentals by a consumer price index, or some comparable standard, in leasing agreements. Nor is there anything improper in computing future wages or salaries by such an index in collective bargaining or employment contracts. As long as there is a national currency, however, which by law is legal tender for the payment of public and private debts, we hold that the indexing device cannot properly be applied to the principal of a debt evidenced by a promissory note payable in that currency.

Accordingly, the judgment of the Chancellor is reversed, all costs taxed against the [**15] appellee, Union Planters National Bank of Memphis.

FONES, C.J., and COOPER, HENRY and HARBISON, JJ., concur.

[54] METHOD AND SYSTEM FOR
DETERMINING INTEREST RATES

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[51] Int. Cl.² G06F 13/00[52] U.S. Cl. 364/200; 235/379;
340/149 R[58] Field of Search ... 364/200 MS File, 900 MS File,
364/300; 235/156, 379, 380; 340/146.2, 149 R

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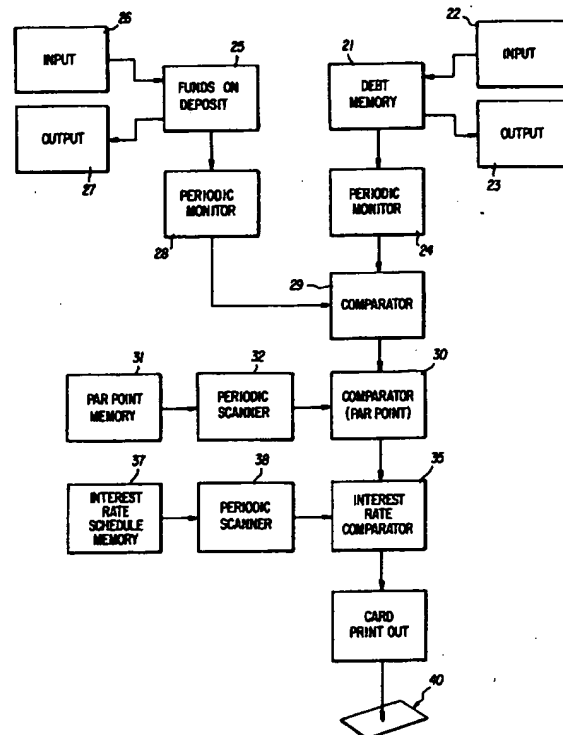
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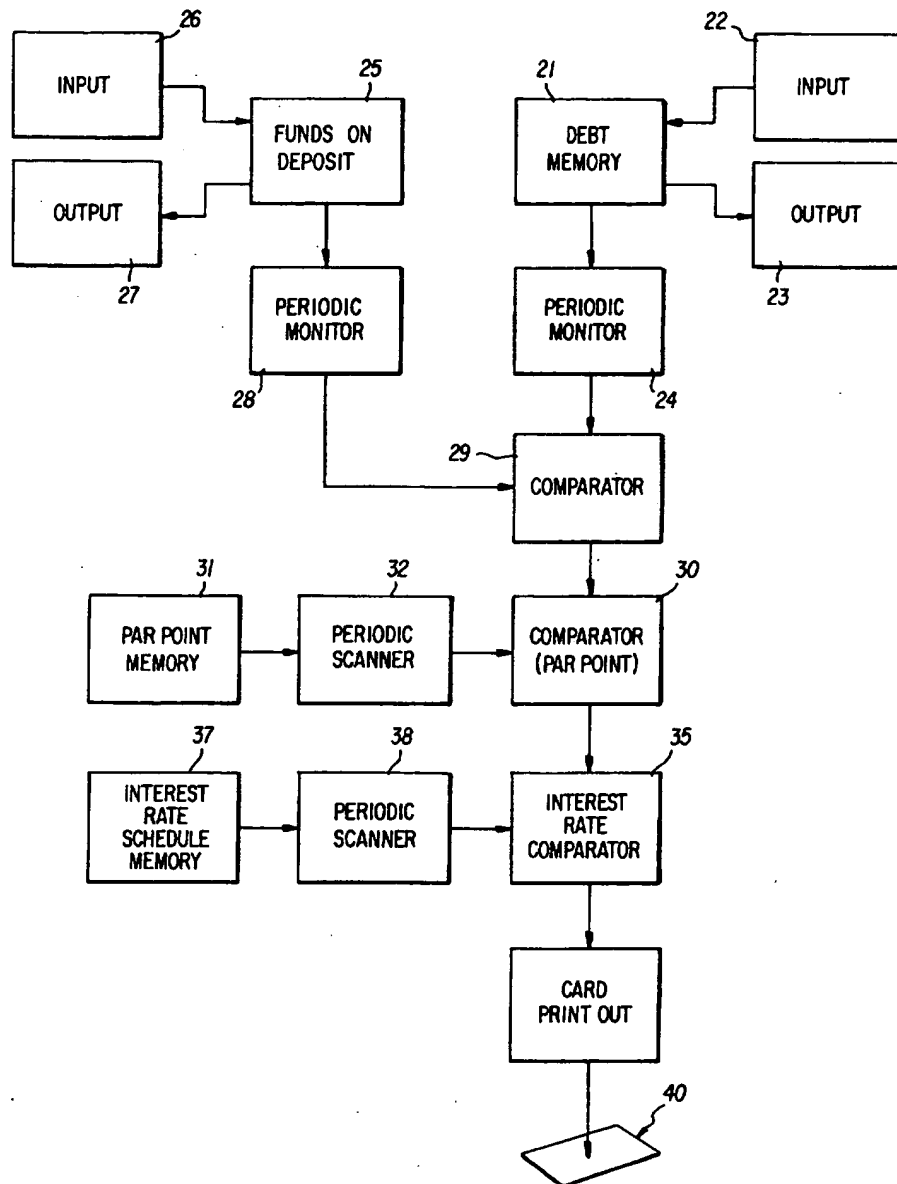
[57] ABSTRACT

A method and a system are provided wherein an interest rate fluctuates according to the ratio of a borrower's funds on deposit with the lender, to the borrower's outstanding indebtedness (or to the outstanding indebtedness combined with line of credit) at any time, and for the duration of a selected period of time. The ratio of the borrower's funds on deposit with the lender, to the borrower's loan balance (or to the borrower's loan balance combined with line of credit), forms a Compensating Balance.

This method and system provide for each individual lender to set a "par point", which is the Compensating Balance required by the lender in order for the borrower to qualify for a pre-determined interest rate. The interest rate of the loan automatically fluctuates inversely to the fluctuation of the borrower's Compensating Balance from the "par point". As the Compensating Balance increases, the interest rate decreases, and as the Compensating Balance decreases, the interest rate increases.

10 Claims, 1 Drawing Figure





METHOD AND SYSTEM FOR DETERMINING INTEREST RATES

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to methods of and systems for accounting, and more particularly, this invention relates to methods of and systems for determining interest rates.

2. Background Considerations

It is customary for banks to expect, and frequently to require, borrowers to maintain funds on deposit with the bank equal to a certain percentage of the borrower's loan, or of a combination of the borrower's loan and the line of credit extended by the bank, or of the line of credit, only.

In current banking terminology these funds on deposit are referred to as "Compensating Balance". Compensating Balance is the amount of funds the borrower has on deposit in the lender bank, as a percentage of the outstanding loan balance, or as a percentage of the outstanding loan balance combined with a percentage of the line of credit, or possibly as a percentage of the line of credit only. Bankers refer to Compensating Balance in terms of percentages rather than dollars. For example, they would refer to a 20% Compensating Balance rather than to a \$14,000 Compensating Balance.

Borrowers are reluctant to leave funds on deposit with a bank because they could be earning income with the funds if they were not on deposit. Funds on deposit are an advantage to the bank because it gives them funds which they can lend to earn additional income.

Therefore, it is an advantage for the bank to offer an inducement to the borrower to leave sizeable balances on deposit, and a lower interest rate on their loan would be such an inducement.

Large corporations usually have an officer who is responsible for investing temporarily idle funds to earn maximum returns. The instant invention would save time for this officer, because the funds could be left on deposit with the bank to reduce the interest rate on the loan, rather than the officer's having to search for a savings institution or other short-term investment for the funds. This also enhances the borrower/lender relationship.

Funds on deposit are to a bank as inventories are to a business and are expected to produce a given gross profit. The instant invention tends to stabilize funds available for lending and, thereby, stabilize the bank's gross profit.

It is customary for banks to lend money at prime rate plus points and fractional points above prime rate. For example, if prime rate is 6%, they may quote an interest rate of "2 points above prime", making the interest rate 8%. This gives the bank a gross markup of 2.5%, using the standard retail system of inventory (6 divided by 0.75 equals 8). When the prime rate goes up or down, and they add the same points, their markup percentage changes. The instant invention will be advantageous to the bank in that it offers a system for controlling their desired markup, because it facilitates the use of percentages of prime rate rather than using points. The percentages used will be established by each bank. They should tend to decrease the gross profit percentage as the prime rate increases, and vice versa.

Although the borrower and the lender may agree on an amount of Compensating Balance when the loan is initiated, lenders now have no easy way of automatically comparing total funds on deposit, loan balances, line of credit, and agreed Compensating Balance. Generally, this is done manually from average-balance figures furnished the loan officer, a time-consuming process. Also, the figures may be furnished at longer time intervals than the bank would prefer, at which time the Compensating Balance may have been below the agreed amount. The bank then notifies the borrower to increase the funds on deposit.

If banks utilize the instant invention through a computer, the computer could be programmed to notify the loan officer of irregularities in the borrowers' accounts. For example, the loan officer could be notified daily (or with whatever frequency the bank desires) of borrowers whose Compensating Balance has reached the critically-low point. This also may alert the loan officer to the possibility of financial difficulty of the borrower. Additional information, not a part of the instant invention, could be furnished the loan officer with very little added expense, such as delinquent interest payments, delinquent loan reductions, and/or delinquent loan pay-offs.

The instant invention will save bank personnel time by automatically relating the funds on deposit to the loan balance (or to a combination of loan balance and line of credit—see explanation of Compensating Balances on pages 8 and 9), thereby producing a Compensating Balance, and relating it to the agreed Compensating Balance, without the loan officer's having to make the manual comparisons and computations. This would enable each loan officer to handle more accounts, permitting the bank to have a smaller staff. The loan officer would also have more current information on which to make judgments.

The instant invention will improve relations between borrower and lender. The lender will be helping the borrower to keep interest rates low by notifying the borrower when the Compensating Balance is less than agreed, rather than criticizing the borrower for not maintaining the agreed Compensating Balance.

OBJECTS OF THE INVENTION

In view of the aforementioned considerations, it is an object of this invention to provide a new and improved method of, and system for, determining and computing the interest rate on commercial loans.

It is a further object of the instant invention to provide a new and improved method of, and system for, computing interest rates, wherein the interest rate is determined by the Compensating Balance of the borrower.

It is an additional object of the instant invention to provide a new and improved method of, and system for, determining and computing interest rates, wherein the interest rate is automatically adjusted periodically as directed by the borrower's current Compensating Balance.

It is still another object of the instant invention to provide a new and improved method of, and system for, determining and computing interest rates wherein the method and system are flexible to accommodate various conditions.

SUMMARY OF THE INVENTION

In view of these and other objects, the instant invention contemplates a method of, and system for, computing interest rates, wherein a borrower's interest rate is set at a par point which is a ratio of the borrower's funds on deposit to the borrower's indebtedness, which ratio is the borrower's Compensating Balance. Periodically the borrower's funds on deposit and amount of indebtedness are monitored. The borrower's outstanding indebtedness and funds on deposit are then compared to determine a current Compensating Balance, and this Compensating Balance is compared to the Compensating Balance used to determine the par point. If the Compensating Balance exceeds the Compensating Balance on which the par point was determined, then the borrower's interest rate is decreased, and if the Compensating Balance is less than the Compensating Balance determining par point, the borrower's interest rate increases.

BRIEF DESCRIPTION OF THE DRAWING

Referring now to the drawing, there is shown portions of a general purpose computer of the type normally used to perform accounting services.

DETAILED DESCRIPTION

The computer includes a debt memory 21, which has individual addresses identified with various borrowers, in which the outstanding indebtedness of each borrower is recorded. The amount of indebtedness varies periodically, according to the money paid on the debt, as identified by input 22, or money loaned on a particular account, as identified by output 23. For purposes of convenience, the input 22 and output 23 may be embodied in a conventional send and receive printer.

The debt portion of the memory 21 is scanned periodically by a monitor 24. The monitor 24 may also scan the debt memory on demand. The interval between scanning may be, for example, every quarter, every month, every week or even every day. The computer, therefore, always knows how much outstanding indebtedness is attributable to each borrower.

The computer also includes a funds-on-deposit memory 25. As with the debt memory, the funds-on-deposit memory includes an input 26 for deposits and an output 27 for withdrawals, which may be embodied in a printer. For each address in the funds-on-deposit memory 25, there is a corresponding address in the debt memory 21.

The funds-on-deposit memory is monitored periodically by a monitor 28, which functions similar to the monitor 24 associated with the debt memory. The monitor 28 can function on demand, so that the funds-on-deposit may be determined at any desired time, and the monitor 28 can check the funds on deposit automatically during time periods of a quarter, month, week or day. Preferably, the monitor 28 functions simultaneously with the monitor 24; however, simultaneous operation is not mandatory.

The output from the monitors 24 and 28 are fed into a comparator 29, which contains a division circuit that sets up a ratio between the output of the monitors 24 and 28. For convenience, this output can be expressed as the ratio of funds on deposit to outstanding loan or some combination of indebtedness and line of credit, called Compensating Balance. This Compensating Bal-

ance is used to determine the interest rate on outstanding indebtedness.

The par point, entered into the memory 31, is decided on by the bank and agreed to by the borrower at the inception of the loan.

The output of the comparator 30 is fed into an interest comparator 35, which also receives an input from a memory 37 that stores an interest rate schedule for each account. The interest rate schedules may be standard schedules or may be schedules which are specifically associated with each account. If the schedules are standard, then the address of each account may include a code, which identifies the standard schedule being used. In the comparator 35, the compensating balance is then matched to the interest rate associated therewith. This information is subsequently printed out on a card in a standard fashion. The card includes such information as the date, outstanding indebtedness, funds on deposit, par point, the Compensating Balance and the interest rate.

In practicing the foregoing invention, the Compensating Balance is related to a base rate and to a Compensating Balance Variation Factor (CBVF). Both the base rate and the CBVF are agreed on in advance by the lender and the borrower. Generally, to arrive at the actual interest rate the lender may use any method desired for his calculations. However, the method for predetermining the possible fluctuations of interest rate is preagreed by both the lender and the borrower.

Following are four examples of the many ways banks may use Compensating Balance:

Some banks use Compensating Balance as it relates to the outstanding loan balance. For example:

(1) A borrower has a line of credit of \$100,000, an outstanding loan balance of \$70,000, and the bank requires a Compensating Balance of 20% of the outstanding loan balance, which is \$14,000 funds on deposit.

Other banks consider the Compensating Balance as it relates to both the outstanding loan balance and the line of credit the bank extends to the borrower, or a portion thereof. For example:

(1) A borrower has a line of credit of \$100,000, an outstanding loan balance of \$70,000, and an agreed Compensating Balance of 20% of the loan balance, \$14,000, plus an agreed Compensating Balance of 10% of the \$30,000 unused portion of the line of credit, requiring an additional \$3,000 in funds on deposit, a total of \$17,000 in funds on deposit.

(2) The bank requires a Compensating Balance on the full amount of the line of credit plus an additional Compensating Balance on the outstanding loan. Line of credit \$100,000, outstanding loan balance \$70,000, and agreed Compensating Balance of 5% on the line of credit, plus an agreed Compensating Balance of 15% of the outstanding loan balance, totaling \$15,500 funds on deposit.

Presently, it is not in common usage, but banks may require a Compensating Balance on the line of credit only. For example:

(1) Line of credit \$100,000, loan balance \$70,000, an agreed Compensating Balance of 15% of the line of credit, requiring \$15,000 funds on deposit.

The following examples use Compensating Balance as the percentage of funds on deposit to loan balances, only, and do not take into consideration Compensating Balance as the percentage of funds on deposit to the line of credit, or as the percentage of part of the line of credit.

EXAMPLES

The Table 1 is a schedule which has, as its base rate, an assumed prime rate of 8%. The base rate can be a discount rate or any other rate that the lender selects.

the CBVF. For example, a lender might select a 10% Compensating Balance as the par point with whatever CBVF they wish. The base rate, the spread of the Compensating Balance percentages and/or the CBVF may vary between the interest rate tables.

TABLE 1

INTEREST RATE CHART													
Base Rate: Prime Rate 8%													
If compensating Balance Percent	PAR POINT												
is:	0	5	10	15	20	30	40	50	60	70	80	90	100
Compensating Balance Variation Factor													
Add to or (subtract from) Base Rate this percent of Base													
Rate:	102.5	77.5	58.75	46.25	40.0	33.75	27.5	21.25	15.0	8.75	2.5	(3.75)	(10.0)
Actual Interest Rate on Loan													
is:	16.2	14.2	12.7	11.7	11.2	10.7	10.2	9.7	9.2	8.7	8.2	7.7	7.2

The borrower's Compensating Balance determines the CBVF which, in turn, determines the interest charged the borrower at any given time. By using the aforedescribed system, the lenders can obtain a borrower's Compensating Balance as often as they elect to do so, i.e., daily, monthly, quarterly, etc., and the interest may

Table 2 is a schedule illustrating an approach in which the Compensating Balance percentages are calculated in 1% increments between 30% and 40%. This type of schedule accommodates situations in which a great deal of money is involved, necessitating relatively precise interest calculations.

TABLE 2

INTEREST RATE CHART (If Compensating Balance is between 30% and 40% of Loan Balance)										
Base Rate: Prime Rate 8%										
If Compensating Balance percent										
is:	31	32	33	34	35	36	37	38	39	40
Compensating Balance Variation Factor										
Add this percent of Base Rate to Base										
Rate:	33.125	32.5	31.875	31.25	30.625	30.00	29.375	28.75	27.125	27.5
Actual Interest Rate on Loan:	10.65	10.6	10.55	10.5	10.45	10.4	10.35	10.3	10.25	10.2

be computed for that period, in accordance with the schedule which the lender and borrower have prearranged. The schedule of Table 1 is entered into the interest rate schedule memory 37.

Instead of using percentages, interest rates or fractions thereof could be used in the CBVF. For example, the percentage 40 is actually 3.2% above a prime rate of 8%, because 40% of 8% equals 3.2%. Consequently, the interest on the loan is 11.2%, i.e., 8% plus 3.2%

Table 3 illustrates a third example of an interest rate chart, which may be used for another type of borrower, who is a "prime borrower" borrowing at a prime rate of 8%. Note, in this chart, the par point is identified at a Compensating Balance percent of 20, a CBVF of zero and an actual interest rate of 8%. As set forth, schedules of Tables 1, 2 and 3 are stored in the interest rate schedule memory and can be obtained in a well-known fashion by the scanner 38.

TABLE 3

INTEREST RATE CHART													
Base Rate: Prime Rate 8%													
If Compensating Balance percent	Par point												
is:	5	10	15	20	30	40	50	60	70	80	90	100	110
Compensating Balance Variation Factor													
Add to or (subtract from) Base Rate this percent of Base													
Rate:	37.5	18.75	6.25	0	(6.25)	(12.5)	(18.75)	(25.0)	(31.25)	(37.5)	(43.75)	(50.0)	(56.25)
Actual Interest Rate on Loan													
is:	11.0	9.5	8.5	8.0	7.5	7.0	6.5	6.0	5.5	5.0	4.5	4.0	3.5

equals 11.2%. A standard procedure with banks is to charge the prime rate plus interest points. For ease of computation, actual percentage points, or fractions thereof, could be used instead of the percentages of the base rate. As set forth before, the lenders will set their own Compensating Balance Variation Factors (CBVF). In Table 1, 20% of the loan was identified as the par point in the Compensating Balance because many lenders expect borrowers to maintain a 20% Compensating Balance. This ratio, of course, may vary from one lender to another.

In using this system, lenders will determine their own pattern of spread in the Compensating Balance and in

The system, according to the instant invention, enables the lender and borrower to agree in advance on a fluctuating interest rate on borrowed money, from interest rate schedules which are based on a base rate for interest rates, and factors which are added to or subtracted from the base rate (CBVF). These factors combine to give a printout of interest charged to borrowers.

Any lender in establishing an Interest Rate Chart may use any base rate, any Compensating Balance percent,

any spread of Compensating Balance Variation Factors (or percentage points), and any combination thereof.

What is claimed is:

1. A method for providing data regarding interest rates comprising the steps of:
 - storing the value of a borrower's funds on deposit in a computer memory;
 - storing the amount of a borrower's indebtedness in the computer memory;
 - monitoring the computer memory periodically by a scanning means connected to the computer memory to determine the extent of the borrower's indebtedness and the value of the borrower's funds on deposit at a given time, the scanning means providing at its output a signal corresponding to the borrower's indebtedness and funds on deposit;
 - comparing the borrower's funds on deposit to the borrower's indebtedness by a division circuit means which is connected to the scanning means to determine the ratio of output of the scanning means to form a Compensating Balance; and
 - increasing the interest rate provided by a printout connected to the division circuit means, if the Compensating Balance is less than par point and decreasing the interest rate provided by the printout if the Compensating Balance is greater than par point.
2. The method of claim 1, further including the steps of:
 - determining and storing in the computer memory a par point for initial Compensating Balance and setting an interest rate for that par point; and
 - comparing by a first comparator means subsequently determining Compensating Balance to the initial Compensating Balance to determine whether to increase or decrease the interest rate.
3. The method of claim 2 further including steps of:
 - storing a table of values in the computer memory, wherein a series of Compensating Balances are matched to corresponding interest rates; and
 - comparing by a second comparator means the determined Compensating Balance to the table, in order to determine the interest rate provided by the printout.
4. A system for computing interest comprising:
 - first memory means for storing the value of a borrower's funds on deposit and providing at an output a first signal which corresponds to the funds on deposit;
 - second memory means for storing the amount of a borrower's indebtedness and providing at an output a second signal which corresponds to the indebtedness;
 - third memory means for storing the amount of a borrower's line of credit and providing at an output a third signal which corresponds to the line of credit;
 - means for scanning said first, second and third signals periodically, said means for scanning connected to the outputs of said first, second and third memory means and providing at an output a fourth signal corresponding to the extent of the borrower's loan balance and line of credit and the value of the borrower's funds on deposit at a given time;
 - means for comparing the borrower's funds on deposit to the borrower's loan balance and line of credit, said means for comparing connected to the output of said means for scanning providing at an output a fifth signal corresponding to a Compensating Balance; and
 - means for determining connected to the output of said means for comparing providing at an output a

sixth signal corresponding the interest rate based on the Compensating Balance.

5. The system of claim 4 wherein:
 - said first memory means is comprised of a first memory having an input for receiving deposits and an output for providing withdrawals;
 - said second memory means is comprised of a second memory having an input for receiving money paid to an account and an output for providing money loaned from an account;
 - said means for scanning is comprised of a first periodic monitor connected to said first memory and a second periodic monitor connected to said second memory;
 - said means for comparing is comprised of a division circuit; and
 - said means for determining is comprised of a par point memory connected to a periodic scanner connected to a par point comparator, and interest rate schedule memory connected to a periodic scanner connected to an interest rate comparator connected to a card printout, said par point comparator connected to said division circuit and said interest rate comparator.
6. An apparatus for providing data regarding a borrower's interest rates computed from a value of a borrower's funds on deposit, a value of the borrower's indebtedness and a value of the borrower's interest rate at a par point comprising:
 - first memory means having an input and an output, said input for receiving information regarding transactions relating to the borrower's funds on deposit and the borrower's indebtedness said output providing a signal corresponding to the borrower's funds on deposit and the borrower's indebtedness;
 - first comparator means having an input and an output, the input of said comparator means connected to the output of said memory means, and the output of said comparator means providing a signal corresponding to a Compensating Balance which is a ratio of the borrower's funds on deposit to the borrower's indebtedness;
 - second memory means having an input for receiving information regarding an interest rate and par point schedule and having an output providing a signal which corresponds to the interest rate and par point schedule;
 - second comparator means for comparing the output of said second memory to the output of said first comparator means, said second comparator means having an output providing a signal which corresponds to the indebtedness, funds on deposit, par point, Compensating Balance and interest rate; and
 - print means having an input for receiving the output of said second comparator, said print means providing a card having information corresponding to the output signal of said second comparator.
7. The apparatus of claim 6 wherein said first memory means further comprises a periodic monitor and said second memory means further comprises a periodic scanner.
8. The apparatus of claim 7 wherein said first comparator is a division circuit.
9. The apparatus of claim 8 wherein said first memory means has inputs for receiving money paid to an account and for receiving deposits and has outputs for providing money loaned from accounts and for providing withdrawals.
10. The apparatus of claim 9 wherein said print means is a send and receive printer.